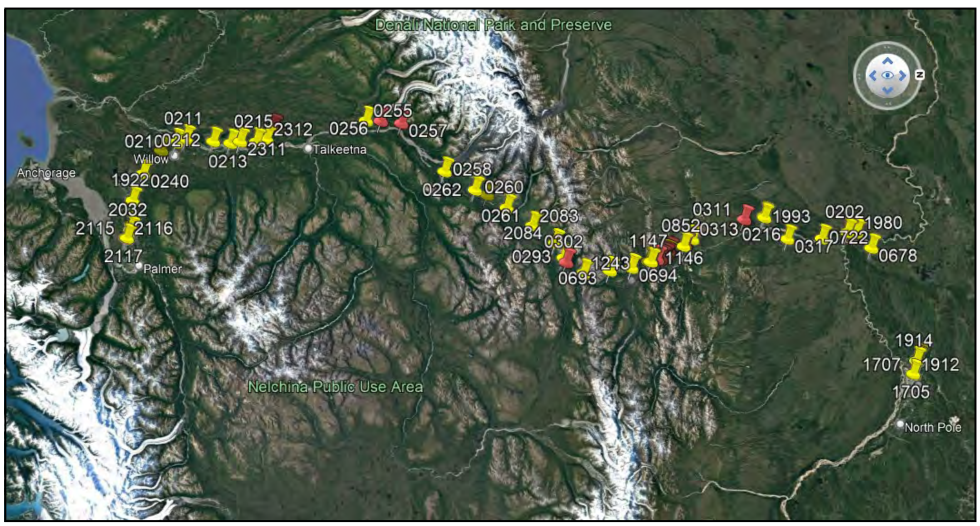
Research & Technology Transfer

Alaska Department of Transportation & Public Facilities

Aerial Infrared Scanning of Bridge Decks on Parks Highway to Map Delaminations

FINAL REPORT



Prepared by:
Infrasense, Inc.
Woburn, MA

Report # FHWA-AK-RD-000S(960)
March 2, 2023

Prepared for:
Alaska Department of Transportation & Public Facilities

Statewide Research Office
3132 Channel Drive
Juneau, AK 99801-7898

REPORT DOCUMENTATION PAGE	Form approved OMB No.

Public reporting for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestion for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-1833), Washington, DC 20503

1. AGENCY USE ONLY (LEAVE BLANK)	2. REPORT DATE October 14, 2022	3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE Aerial Infrared Scanning of Bridge Decks for Detecting and Mapping Delaminations	5. FUNDING NUMBERS State project numbers Federal project numbers 000S(960)
6. AUTHOR(S) Adam Carmichael, President Spencer Bates, Staff Engineer	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Infrasense, Inc. 21-G Olympia Avenue, Suite 45 Woburn, MA 01801	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) State of Alaska, Alaska Dept. of Transportation and Public Facilities Research and Technology Transfer 3132 Channel Drive Juneau, AK 99801-7898	10. SPONSORING/MONITORING AGENCY REPORT NUMBER Federal project numbers 000S(960)

11. SUPPLENMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT	12b. DISTRIBUTION CODE
No restrictions	

13. ABSTRACT (Maximum 200 words)

The objective of this project was to demonstrate and evaluate a highly efficient and economical method for evaluation of the condition of bridge decks in Alaska. The method, Aerial Infrared Thermography (Aerial IR), implements traditional infrared thermography from a fixed-wing aircraft using high resolution infrared and visual cameras. To address the objective, the condition of 69 Alaska DOT & Public Facilities (DOT&PF) bridge decks along Parks Highway was evaluated with Aerial IR. Twelve decks from the 69 were identified for an independent ground truth evaluation using traditional chain drag sounding. The results of this project include delamination quantities and supporting plan-view infrared and visual imagery for each surveyed bridge deck. The ground truth evaluation showed that the Aerial IR and chain drag quantities to be within 2% of the deck area on average, and that the mapped locations were similar. An economic analysis shows the return on investment (ROI) of Aerial IR to be estimated at 223% if implemented on a routine basis as well as an estimated annual reduction of 125 hours of inspection personnel to traffic.

14- KEYWORDS : Infrared thermography, bridge deck, delamination	15. NUMBER OF PAGES 17
	16. PRICE CODE N/A

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	N/A

METRIC (SI*) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4		mm
ft	feet	0.3048		m
yd	yards	0.914		m
mi	Miles (statute)	1.61		km
		AREA		
in^2	square inches	645.2	millimeters squared	cm^2
ft^2	square feet	0.0929	meters squared	m^2
yd^2	square yards	0.836	meters squared	m^2
mi^2	square miles	2.59	kilometers squared	km^2
ac	acres	0.4046	hectares	ha
		MASS (weight)		
oz	Ounces (avdp)	28.35	grams	g
lb	Pounds (avdp)	0.454	kilograms	kg
T	Short tons (2000 lb)	0.907	megagrams	mg
		VOLUME		
fl oz	fluid ounces (US)	29.57	milliliters	mL
gal	Gallons (liq)	3.785	liters	liters
ft^3	cubic feet	0.0283	meters cubed	m^3
yd^3	cubic yards	0.765	meters cubed	m^3

Note: Volumes greater than 1000 L shall be shown in m^3

Symbol	When You Know	Multiply By	To Find	Symbol
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (°F-32)	Celsius temperature	°C
		ILLUMINATION		
fc	Foot-candles	10.76	lux	lx
fl	foot-lamberts	3.426	candela/m^2	cd/cm^2
		FORCE and PRESSURE or STRESS		
lbf	pound-force	4.45	newtons	N
psi	pound-force per square inch	6.89	kilopascals	kPa

These factors conform to the requirement of FHWA Order 5190.1A *SI is the symbol for the International System of Measurements

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	Miles (statute)	mi
		AREA		
mm^2	millimeters squared	0.0016	square inches	in^2
m^2	meters squared	10.764	square feet	ft^2
km^2	kilometers squared	0.39	square miles	mi^2
ha	hectares (10,000 m^2)	2.471	acres	ac
		MASS (weight)		
g	grams	0.0353	Ounces (avdp)	oz
kg	kilograms	2.205	Pounds (avdp)	lb
mg	megagrams (1000 kg)	1.103	short tons	T
		VOLUME		
mL	milliliters	0.034	fluid ounces (US)	fl oz
liters	liters	0.264	Gallons (liq)	gal
m^3	meters cubed	35.315	cubic feet	ft^3
m^3	meters cubed	1.308	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 °C+32	Fahrenheit temperature	°F
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/cm^2	candela/m^2	0.2919	foot-lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	pound-force	lbf
kPa	kilopascals	0.145	pound-force per square inch	psi

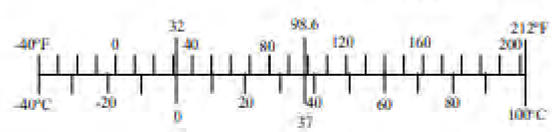


TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The objective of this project was to demonstrate and evaluate a highly efficient and economical method for evaluation of the condition of bridge decks in Alaska. The method, Aerial Infrared Thermography (Aerial IR), implements traditional infrared thermography from a fixed-wing aircraft using high resolution infrared and visual cameras. To address the objective, the condition of 69 Alaska Department of Transportation & Public Facilities (DOT&PF) bridge decks along Parks Highway was evaluated with Aerial IR. Twelve decks from the 69 were identified for an independent ground truth evaluation using traditional chain drag sounding. The results of this project include delamination quantities and supporting plan-view infrared and visual imagery for each surveyed bridge deck. The ground truth evaluation showed that the Aerial IR and chain drag quantities to be within 2% of the deck area on average, and that the mapped locations were similar. An economic analysis shows the return on investment (ROI) of Aerial IR to be estimated at 223% if implemented on a routine basis as well as an estimated annual reduction of 125 hours of inspection personnel to traffic.

CHAPTER 1 - INTRODUCTION AND RESEARCH APPROACH

Problem Statement and Research Objective

Repair and replacement of deteriorated bridge decks represents a considerable expense to many state highway agencies. Decks are directly exposed to weather, traffic, and deicing chemicals. In northern states like Alaska, bridge deck deterioration is most frequently in the form of corrosion-induced delamination resulting from infiltration of chlorides introduced by winter road salting operations. Corrosive conditions produce rust on the surface of the steel, which creates expansive pressures within the concrete and eventually leads to radial cracks from the reinforcing steel that ultimately connect to form a planar "delaminations". During the life of a typical bridge, the deck is typically replaced once and repaired frequently. Deck repair and replacement can be expensive and highly disruptive to traffic. Implementing the correct treatment at the right time is important towards optimizing the use of limited funds across the deck inventory.

Accurate assessment of the extent and severity of deck deterioration is required by highway agencies for prioritizing, planning, and scoping maintenance and rehabilitation actions. Accurate quantitative assessments have traditionally been difficult to obtain, since the mechanisms of deterioration typically occur below the concrete surface, and early manifestations are not readily observed in visual inspections. Conventional in-depth inspection methods, such a sounding and half-cell testing are time consuming and require closures and exposure of personnel. Deck condition assessment based on visual inspection alone, as is frequently the case, can lead to suboptimal management level decisions in the form of misallocated funds and resources, as well as inappropriate rehabilitation designs leading to expensive construction overruns.

In recent years newer technologies for bridge deck condition assessment have been introduced (SHRP2, 2013). These technologies, including ground penetrating radar, infrared thermography, and ultrasound, have offered the promise of providing more accurate deck condition information without the need for closures. These new methods have been implemented to some degree by several state agencies, but cost is still a factor limiting widespread use.

One new technology, Aerial Infrared Thermography (Aerial IR) has emerged with the potential for condition evaluation of many decks in a short period of time at a fraction of the cost of other methods. With infrared thermography, solar heating of a bridge deck produces higher surface temperatures over delaminated areas due to the thermal barrier caused by the delamination. These temperature increases, which may be on the order of 2-3 °F, are readily detected with modern infrared cameras. Traditional infrared thermography for bridge decks is implemented with an IR camera mounted to a survey vehicle driving across the deck (ASTM, 2022). Aerial IR is an adaptation of conventional IR using high-resolution infrared and video cameras are mounted to a fixed wing aircraft flying at up to 1000 feet. Aerial IR is an established technology for other applications, such as detection of leaks in roofs and water distribution systems and locating faults in electrical distribution systems, and its adaptation to bridge decks is relatively recent. To date, Aerial IR surveys have been carried out on 2400 bridge decks in four different states.

The goal of this project has been to demonstrate and evaluate the effectiveness of Aerial IR for bridge decks in Alaska. This goal has been achieved by conducting an Aerial IR survey on a group of 69 decks and confirming the findings of the survey using an independent traditional chain-drag survey on a select group of 12 decks.

Scope of Study

The scope of the study has included evaluating the condition of 69 Alaska Department of Transportation & Public Facilities (DOT&PF) bridge decks along Parks Highway. The list of bridges can be found in Attachment B. The deck condition evaluations were carried out using aerial infrared thermography (Aerial IR) and corresponding visual imaging data collected from a fixed wing aircraft. The results of this project include delamination quantities and supporting plan-view infrared and visual imagery for each surveyed bridge deck. A chain drag ground truth evaluation of a select group of decks was carried out independently by Moffatt & Nichol of Anchorage, AK. The bridges evaluated in in this project are listed in Attachment B, along with evaluation results.

The Aerial IR data was collected between June 4^{th} and 5^{th}, 2022, during mostly sunny weather conditions with temperatures in the mid-70's Fahrenheit, following overnight temperatures in the high 50's Fahrenheit. The equipment used in this evaluation is shown in Attachment A.

Research Approach & Methodology

The research approach has been to carry out a commercial Aerial IR survey using an experienced Aerial IR service provider, and to confirm the results of this survey using traditional testing carried out by an independent consultant. The Aerial IR data collection was carried out by Stockton Infrared Thermographic Services, Inc. of Randleman, North Carolina, a company that has conducted similar surveys on 2400 bridge decks over the past 4 years. The aerial data was collected with a high-resolution infrared camera and telephoto lens along with a high-resolution visual camera from a fixed-wing airplane operated by a licensed pilot and within all applicable FAA regulations. The infrared and visual camera data was delivered to Infrasense via a file sharing website for subsequent quality assurance review. For each bridge surveyed, Infrasense was provided with a sequence of IR and visual images collected as the airplane flew over the bridge, as shown in Figure 1. For short bridges there was usually one image of the sequence that covered the entire bridge, and that image served as the basis for analysis. For longer bridges, it was necessary to stitch together multiple images to obtain a single composite plan-view image. Figure 1 shows a sequence of images that were combined to create a single plan-view infrared image of the deck.

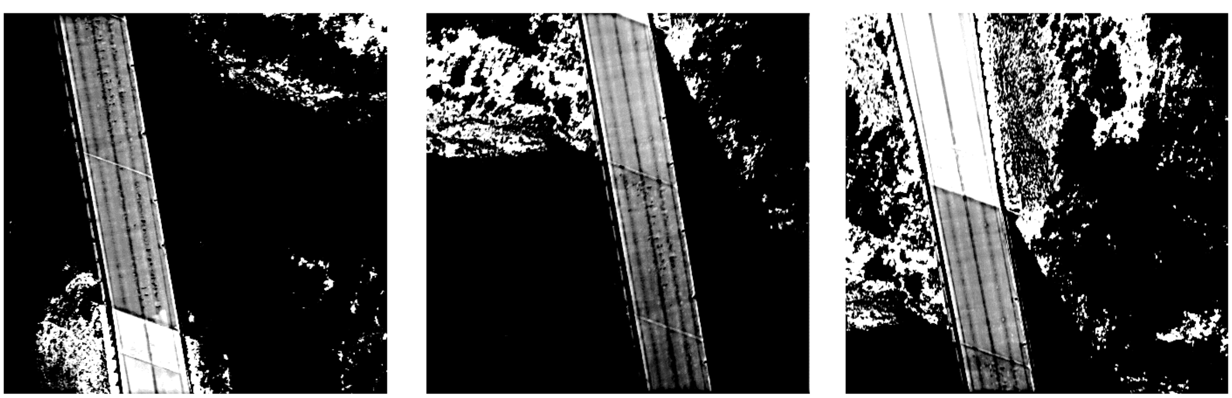
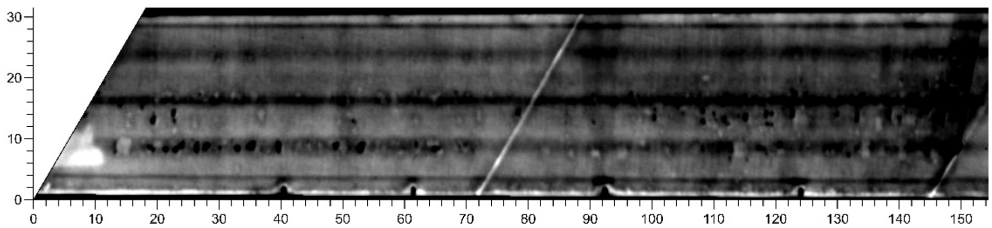


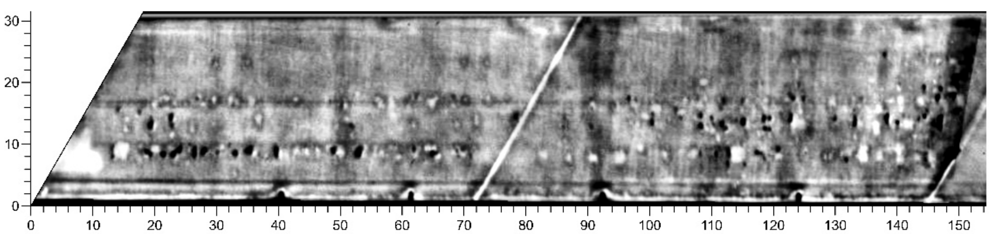
Figure 1. Sample of Raw Aerial IR Image Sequence (Structure 1141)

To highlight more subtle features, the plan view IR and visual deck images are processed to produce "enhanced" versions of the plan-view images. This is done using proprietary software that analyzes the pixels within the bridge deck. For visual imagery, an "adaptive histogram equalization" enhancement is applied to increase contrast, which makes it easier for patches and spalls to be identified and mapped. For infrared imagery, a “transverse normalization” enhancement is applied to remove thermal banding that can be attributed to structural elements such as girders, parapet reflections, or surface wearing in the wheelpaths, creating better contrast of thermal anomalies within the infrared images.

Figures 2a and 2b below demonstrate the effects of the transverse normalization enhancement on the infrared image. Note the increase in contrast, which makes the “hot spots” corresponding with delaminations more distinguishable from patching and spalls. This is especially helpful in identifying smaller and more subtle delaminations. The effects of wheelpaths and structural elements on the IR data are also lessened significantly.



(a) Original IR Image



(b) Enhanced IR Image

Figure 2. Example of IR Image Enhancement (Structure 1141)

The plan-view IR and visual images generated for each of the prescribed decks are provided in Attachment C. Figure 3 shows a sample area of plan-view Aerial IR and visual images. Image (a) is the visual plan-view, image (b) is the IR plan-view, and image (c) is the IR plan-view showing the mapped delaminated areas. Prior to creation of these images, a base map is drawn using the dimensions shown in the provided drawings, and then the images are scaled to match the base maps. In this way all mapping is carried out on scaled images and all mapped areas are true to scale.

The infrared image is created using a grey scale, where temperature is proportional to the brightness of the image, so bright areas represent areas of higher temperature. Delaminations block the flow of heat into the deck, and therefore the heat buildup above the delamination produces the bright “hot spots” shown in the IR image. Note that, due to their material differences, patches also show up in the IR image, but they are distinguished from delaminations by the fact that they show up in both the visual and IR images. Delaminations appear only in the IR image.

Note that occasionally the stitching of multiple images encountered alignment problems resulting in slight "kinks" in the resulting stitched image. The underlying data and analysis, however, is not affected. Delamination mapping was limited on some bridges due to obstructions such as on-going construction or excessive shadows from nearby trees, superstructure elements, outside barriers and rails. Additionally, a number of bridges with asphalt overlay showed thermal anomalies that were not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature.

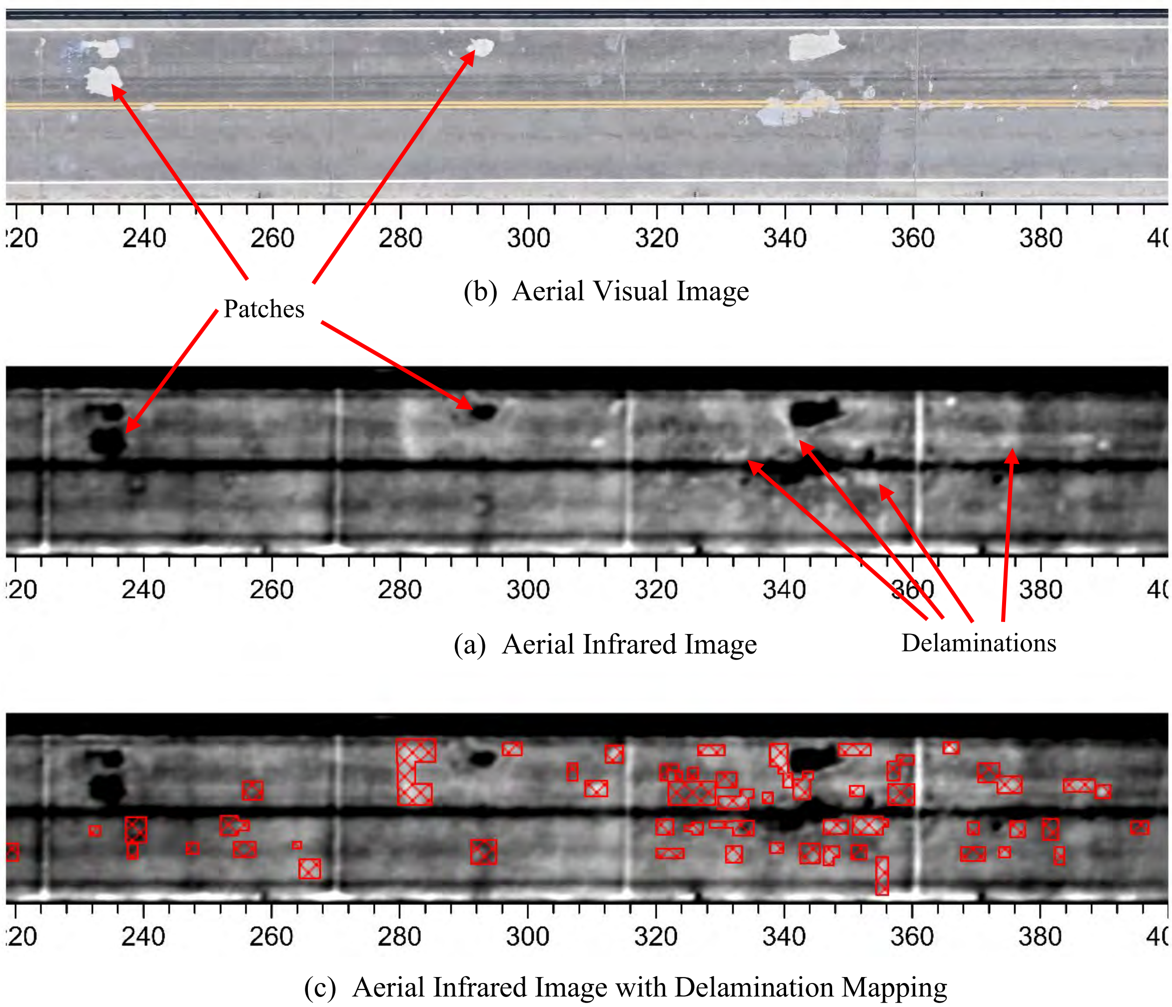


Figure 3. Sample Area of Aerial Visual and Infrared Plan-View Images (Structure 1143)

The Aerial IR plan-views described above were reviewed by an experienced analyst to quantify and map the extent delamination, as show in Figure 3c. The quantities determined through this analysis have been reported for each bridge deck in square footage and percent of deck roadway area in Attachment B, in the columns labeled “Aerial IR Delamination Quantity (%)” and “Aerial IR Delamination Quantity (ft^2)”.

Twelve of the 69 decks surveyed with Aerial IR were selected for a manual chain drag survey. The decks were selected to provide a range of conditions from limited to extensive delaminations based on an initial review of the Aerial IR data. The chain drag evaluation was carried out by an independent consultant, Moffatt & Nichol. The list of decks and the resulting quantities are shown in Table 2.

CHAPTER 2 - FINDINGS

A statistical summary of Aeria IR results is shown in Table 1 below. The table shows that most of the decks fall into the 0% - 5% range, and only two decks have quantities greater than 10%.

Table 1 – Deck Delamination Quantity Summary

Deck Delamination (%)	Number of Decks	% of Decks Evaluated
0-1	27	39.1%
1-2	17	24.6%
2-3	9	13.0%
3-5	11	15.9%
5-10	3	4.3%
>10	2	2.9%

The results of the chain drag evaluation, and the comparison of these results to the Aerial IR results, are shown in Table 2. The table shows that, on average, the chain drag and Aerial IR results were within 2%. Structure 0697 is the most significant outlier; discounting this deck results in an average absolute difference of 1.4%. Figure 4 shows a sample of the Aerial IR (red hatched) and chain-drag (solid color areas) mapped delaminations along with the corresponding infrared imagery. This sample is representative of most comparison decks, which show a reasonably good spatial correlation between the Aerial IR and chain-drag results. Decks with lower delamination quantities had the least spatial correlation between the two methods.

Table 2 – Chain-Drag vs. Aerial Delaminations Quantities

Structure Number	Aerial IR Delamination (% of deck area)	Chain-Drag Delamination (% of deck area)	Absolute Difference (% of deck area)
0254	2.1%	0.2%	1.9%
0256	0.9%	<0.1%	0.9%
0257	0.6%	0.0%	0.6%
0302	1.1%	0.0%	1.1%
0311	1.8%	0.2%	1.6%
0697	11.9%	3.1%	8.7%
0851	2.3%	2.2%	0.1%
1075	4.0%	0.9%	3.1%
1141	8.5%	8.5%	0.0%
1143	5.8%	6.8%	1.0%
1144	2.4%	0.1%	2.3%
1146	4.4%	1.3%	3.1%

Maps like those shown in Figure 4 were produced for all 12 comparison bridges and can be found in Attachment D.

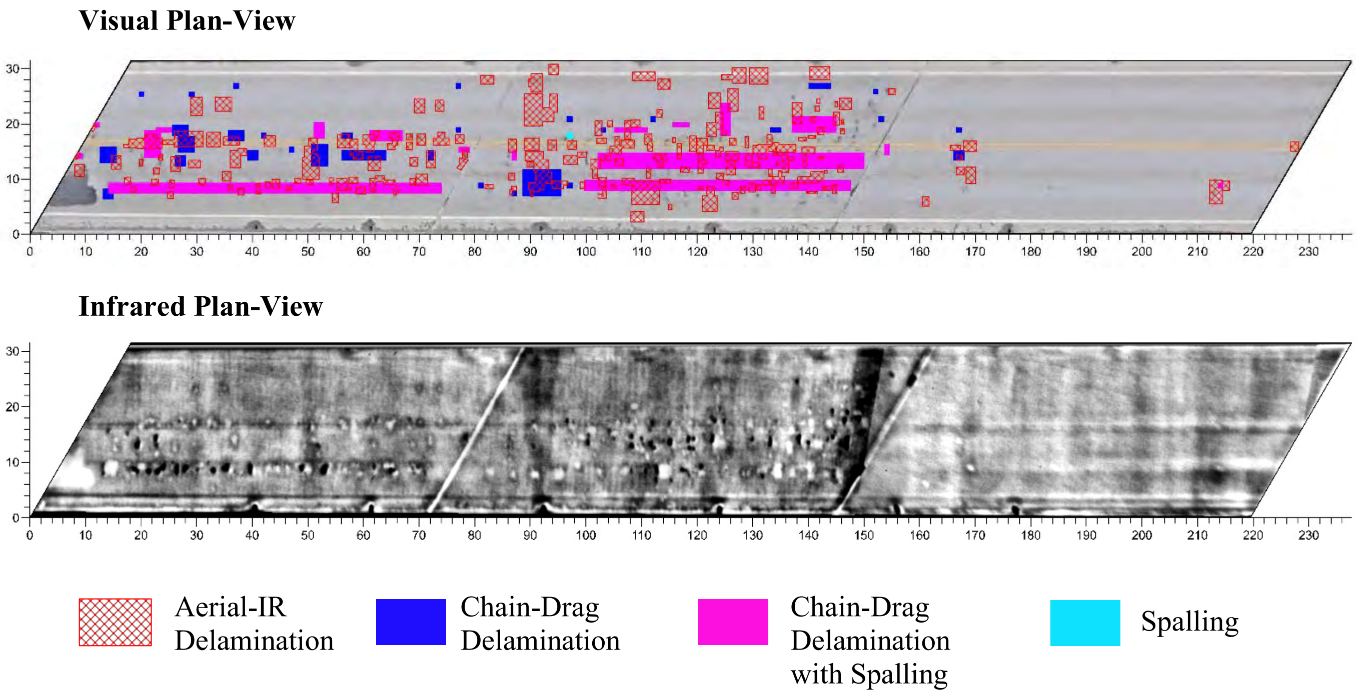


Figure 4. Sample Chain-Drag vs. Aerial Delamination Maps (Structure 1141)

CHAPTER 3 - INTERPRETATION, APPRAISAL, AND APPLICATIONS

General Recommendations

The results of this research show Aerial IR to be an effective method at detecting subsurface delaminations in bridge decks. The resulting delamination quantities were found to be within 2% of the quantities detected by chain-drag surveys, on average, and the spatial correlation between Aerial IR and chain-drag results were found to be reasonably good. Given the established accuracy of Aerial IR, there are numerous benefits to this method over manual chain-drag which are outlined in Table 3 below.

Perhaps the most significant benefits of Aerial IR are the considerable advantages in efficiency and safety. The following text provides the details of economic and safety analyses, which show the return on investment (ROI) of Aerial IR to be estimated at 223% if implemented on a routine basis and an estimated annual reduction of 125 hours of inspection personnel to traffic. In addition to the economic and risk mitigation benefits, it is estimated that there would be an annual reduction of 250 hours of lane-closures, which would provide proportional savings in travel delay/ user costs.

Return on Investment (ROI)

Cost for Chain-Drag of 69 decks to produce delamination maps[1]	=	$155,595
Cost for Aerial-IR of 69 decks to produce delamination maps[2]	=	$95,526
ROI for this project	=	163%
Estimated ROI if implemented at larger scale[3]	=	223%

1. Chain-drag budget was $27,055 for 12 decks OR $2,255 per deck, for this project.
2. Aerial IR data collection, analysis, and mapping budget was $95,526 for 69 decks OR $1,384 per deck for this research project.
3. Aerial IR cost per bridge decreases significantly at a larger scale. For example, in Wisconsin, where the DOT has programmed Aerial IR surveys on an annual basis, the cost per bridge in 2021 was $654. However, due to relatively high mobilization costs for surveys in Alaska, it is assumed the cost per deck would be approximately 50% higher or $981. Using this rate results in an ROI of 223%.

Risk Mitigation

Estimated lane-closure hours per bridge for DOT&PF chain-drag survey[1]	=	0.5 hours
Estimated DOT&PF or contractor personnel hours exposed to traffic for typical chain-drag survey of a bridge deck[1]	=	1 hour
Estimate lane-closure hours for chain-drag surveys per year (assuming 125 decks)[1]	=	62.5 hours
Estimated DOT&PF personnel hours exposed to traffic for chain-drag surveys per year (assuming 125 decks)[1]	=	125 hours

1. Estimates provided by DOT&PF.

Table 3 – Comparison of Chain-Drag and Aerial Infrared

Metric	Chain-Drag Sounding	Aerial Infrared
Objectivity/Repeatability	Can vary significantly based on inspector, ambient noise, and other environmental factors. Note, proper inspector training will improve repeatability	Highly repeatable data collection: data interpretation can be subjective
Efficiency	Bridges typically take 2-3 hours to sound plus additional time to field document and map	Many decks can be scanned in one day and analyzed in the office
Resolution	Delamination limits are subjective	Delamination limits are documents using high-resolution IR and Visual collection
Weather conditions	Can be done under a wide range of weather conditions. Only limitations are during or immediately following precipitation (deck is wet) or when deck is frozen	Requires sunshine, 20 deg temperature rise from overnight temps.
Documentation	Requires field sketches and physical measurements to reference points	Data scaled to deck dimensions is available digitally and can be reviewed at any time
Traffic Disruption	Requires full lane closures for up to half a day per deck	None
Safety	Inspection personnel exposed to live traffic	No personnel exposed to live traffic
Cost	$2,255/bridge	$981/bridge (when implemented routinely)

CHAPTER 4 - CONCLUSIONS AND SUGGESTED RESEARCH

Conclusions

This research project demonstrated the use of Aerial IR for mapping delaminations in bridge decks, along with various benefits of the technology including:

- Provides delamination quantities and maps comparable to chain drag results
- Results are digitally recorded and can be reviewed by all stakeholders.
- Highly efficient allowing for data to be collected on many decks per day.
- Low-cost allowing for statewide application.
- Significant return on investment (ROI), which is estimated to be ***223%***.
- Improved safety, with no lane-closures, so no personnel exposed to traffic and traveling public is not disrupted. *It is estimated this will save 62.5 lane closure hours and 125 personnel exposure hours per year.*
- Programmed repeat surveys can show growth of delamination areas (and quantities) over time. The results of the repeat surveys can be used to support the development of data-driven deterioration curves within DOT&PF's Bridge Management System.

Suggested Research

The research objectives were met, and no further research is required. It is recommended that DOT&PF consider implementing Aerial IR on a routine and potentially network-level basis.

REFERENCES

ASTM, “Standard Test Method for Detecting Delamination in Bridge Decks Using Infrared Thermography,” ASTM, Annual Book of ASTM Standards, Vol 04.03, Designation: D 4788-03 (Reapproved 2022)

SHRP2, “Nondestructive Testing to Identify Concrete Bridge Deck Deterioration”, SHRP2 Report R06A-RR-1, Transportation Research Board, National Academy of Sciences, 2013

APPENDIX A - Equipment

Figure A1 – Fixed-wing Airplane Used for Aerial IR Surveys

APPENDIX B - Summary of Aerial IR Results

Bridge Number	Features Intersected	Feature Carried By	Length (ft)	Width (ft)	Overlay	Delamination Quantity (%)	Delamination Quantity (ft^2)	Patching Quantity (%)	Patching Quantity (ft^2)
201	NORTH SLOUGH TANANA RIV	PARKS HIGHWAY	617.5	29.9	PPC	1.3%	233	6.5%*	1447*
202	TANANA RIVER AT NENANA	PARKS HIGHWAY	1307.0	30.0	PPC	0.5%	214	2.8%*	1329*
210	WILLOW CREEK	PARKS HIGHWAY	219.8	56.0	AC	2.3%	280		
211	LITTLE WILLOW CREEK	PARKS HIGHWAY	138.5	28.0	AC	3.2%	125		
212	KASHWITNA RIVER	PARKS HIGHWAY	216.5	28.0	AC	3.0%	181		
213	SHEEP CREEK	PARKS HIGHWAY	125.0	28.0	AC	2.6%	92		
215	MONTANA CREEK	PARKS HIGHWAY	140.0	28.0	AC	3.9%	151		
216	NENANA RIVER AT REX	PARKS HIGHWAY	509.8	29.9	PPC	1.4%	219	2.0%*	298*
240	LITTLE SUSITNA RIVER	PARKS HIGHWAY	251.0	39.4	none	3.7%	361	0.6%	85
254	SUSITNA RIVER	PARKS HIGHWAY	1071.8	29.9	PPC	2.1%	660	2.6%*	948*
255	CHULITNA RIVER	PARKS HIGHWAY	790.0	40.0	AC	1.1%	355	0.1%	28
256	TROUBLESOME CREEK	PARKS HIGHWAY	132.8	41.7	MMC	0.9%	49		
257	BYERS CREEK	PARKS HIGHWAY	136.8	41.7	MMC	0.6%	32		
258	HURRICANE GULCH	PARKS HIGHWAY	558.3	31.5	none	2.7%	477	0.1%	11
259	HONOLULU CREEK	PARKS HIGHWAY	120.5	39.7	none	0.8%	40		
260	EAST FORK CHULITNA RIVER	PARKS HIGHWAY	142.7	29.9	AC	10.8%	461	1.1%	54

*Includes subsurface patching detected by Infrared Thermography

Bridge Number	Features Intersected	Feature Carried By	Length (ft)	Width (ft)	Overlay	Delamination Quantity (%)	Delamination Quantity (ft^2)	Patching Quantity (%)	Patching Quantity (ft^2)
261	MIDDLE FORK CHULITNA RIV	PARKS HIGHWAY	363.3	40.0	AC	0.2%	23	1.9%*	294*
262	LITTLE COAL CREEK	PARKS HIGHWAY	268.0	31.1	none	1.4%	117	8.9%	812
293	PASS CREEK	PARKS HIGHWAY	131.5	29.9	none	2.2%	87		
302	JACK RIVER	PARKS HIGHWAY	196.9	29.9	MMC	1.1%	65		
311	BEAR CREEK	PARKS HIGHWAY	81.0	36.1	none	1.8%	53	1.4%	46
313	PANGUINGUE CREEK	PARKS HIGHWAY	127.0	36.1	none	3.7%	168	0.7%	36
317	JULIUS CREEK	PARKS HIGHWAY	85.0	41.0	AC	0.2%	8		
678	LITTLE GOLDSTREAM CK	PARKS HIGHWAY	124.0	40.0	AC	1.3%	64		
693	CARLO CREEK	PARKS HIGHWAY	77.4	42.7	none	2.9%	96		
694	NENANA RIVER PARK BND	PARKS HIGHWAY	358.4	32.5	none	0.8%	96	1.8%	227
695	RILEY CREEK	PARKS HIGHWAY	230.0	52.0	AC	0.4%	47		
697	KINGFISHER CREEK	PARKS HIGHWAY	110.6	44.0	none	11.9%	578		
722	FISH CREEK	PARKS HIGHWAY	62.0	41.0	none	3.8%	97		
851	DRY CREEK	PARKS HIGHWAY	300.5	29.9	none	2.3%	207		
852	DRY CREEK OVERFLOW	PARKS HIGHWAY	179.5	33.1	none	2.6%	157	0.2%	12
1075	DRAGONFLY CREEK	PARKS HIGHWAY	81.5	42.0	none	4.0%	136		
1141	ANTLER CREEK	PARKS HIGHWAY	219.5	31.5	none	8.5%	591	1.2%	89
1142	BISON GULCH	PARKS HIGHWAY	147.6	31.5	none	1.3%	63		
1143	NENANA RIVER AT MOODY	PARKS HIGHWAY	891.1	29.9	PPC	5.8%	1546	2.0%	593
1144	FOX CREEK	PARKS HIGHWAY	81.5	44.0	none	2.4%	87		

*Includes subsurface patching detected by Infrared Thermography

Bridge Number	Features Intersected	Feature Carried By	Length (ft)	Width (ft)	Overlay	Delamination Quantity (%)	Delamination Quantity (ft^2)	Patching Quantity (%)	Patching Quantity (ft^2)
1145	HORNET CREEK	PARKS HIGHWAY	91.5	42.0	AC	4.5%	173	1.1%	44
1146	ICEWORM GULCH	PARKS HIGHWAY	81.5	42.0	none	4.4%	151		
1147	NENANA RIVER PARK STA	PARKS HIGHWAY	500.0	33.0	none	0.9%	155		
1161	CHENA RIV (PARKS HWY) SB	PARKS HIGHWAY	518.7	38.0	AC	1.3%	251	0.8%	197
1243	NENANA RIVER AT WINDY	PARKS HIGHWAY	389.4	32.2	none	0.2%	29		
1244	AIRPORT WAY UC SB	PARKS HIGHWAY	124.8	49.7	AC	1.5%	95		
1705	CUSHMAN ST UC	PARKS HIGHWAY	106.2	74.0	AC	5.3%	414		
1707	W-W RAMP OC	AK HWY-PARKS RAMP	172.7	22.0	AC	1.5%	56		
1878	PARKS/CHENA RIDGE SB	PARKS HIGHWAY	107.0	36.4	AC	0.9%	36		
1879	PARKS/CHENA RIDGE NB	PARKS HIGHWAY	107.0	36.4	AC	0.7%	28		
1912	E-N LOOP RAMP	PARKS-AK HWY RAMP	172.7	22.0	AC	0.6%	22		
1913	CHENA RIV (PARKS HWY) NB	PARKS HIGHWAY	520.3	36.0	AC	1.2%	216		
1914	AIRPORT WAY UC NB	PARKS HIGHWAY	125.7	48.0	AC	4.0%	242		
1922	WASILLA OVERHEAD SB	PARKS HIGHWAY	147.5	40.0	AC	0.5%	31		
1923	WHITES CROSSING OVERHEAD	PARKS HIGHWAY	459.3	39.4	none	3.3%	592	1.4%	343
1980	MONDEROSA OVERHEAD	PARKS HIGHWAY	144.4	40.0	AC	0.4%	24	1.0%*	59*

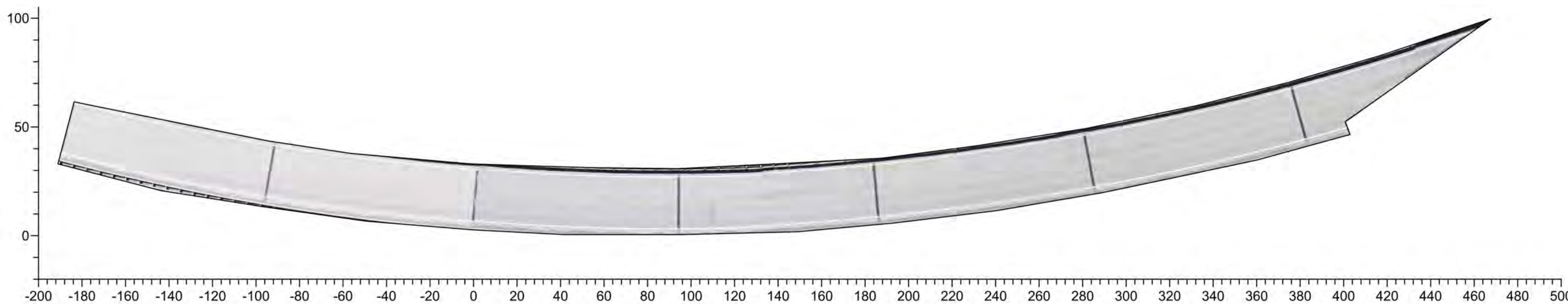
*Includes subsurface patching detected by Infrared Thermography

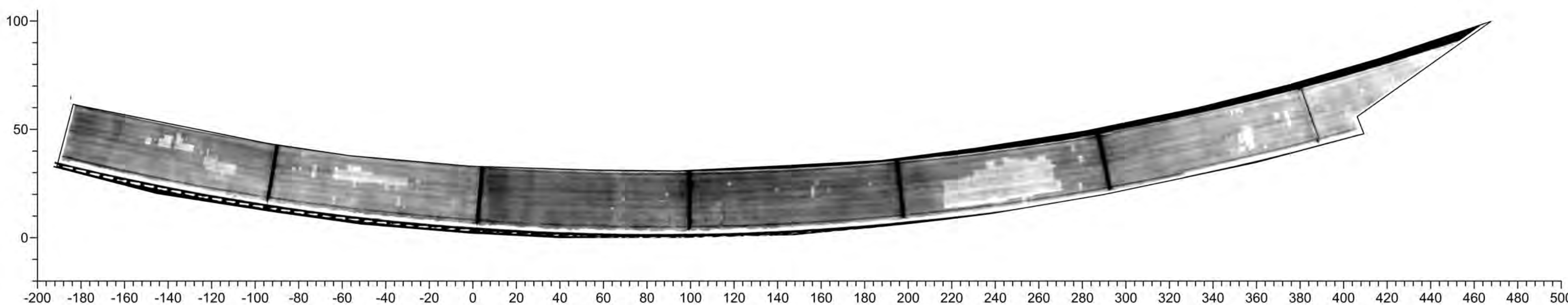
Bridge Number	Features Intersected	Feature Carried By	Length (ft)	Width (ft)	Overlay	Delamination Quantity (%)	Delamination Quantity (ft^2)	Patching Quantity (%)	Patching Quantity (ft^2)
1989	SEWARD MERIDIAN U.C.	PARKS HIGHWAY	193.1	82.7	AC	0.6%	94	2.3%*	379*
1993	REX OVERHEAD	PARKS HIGHWAY	71.7	44.0	AC	0.3%	9	1.2%*	40*
2031	WASILLA CR SOUTHBOUND	PARKS HIGHWAY	85.3	37.4	AC	1.0%	32	1.3%*	44*
2032	WASILLA CR NORTHBOUND	PARKS HIGHWAY	85.3	37.4	AC	1.6%	52		
2033	HYER RD UC SOUTHBOUND	PARKS HIGHWAY	85.3	37.4	AC	0.9%	28	1.5%*	51*
2034	HYER RD UC NORTHBOUND	PARKS HIGHWAY	85.3	37.4	AC	0.2%	5	1.9%*	66*
2035	WASILLA CR SOUTH FRONTAGE	PARKS HIGHWAY SOUTH FRONTAGE	77.1	33.5	AC	1.3%	34		
2036	'WASILLA CR NB RAMP '	PARKS HIGHWAY NB RAMP '	117.1	23.6	AC	0.6%	16	1.5%*	47*
2083	BROAD PASS OVERHEAD	PARKS HIGHWAY	362.9	40.0	AC	0.3%	37	2.6%*	409*
2084	SUMMIT OVERHEAD	PARKS HIGHWAY	145.8	40.4	AC	1.1%	67		
2115	SPRING CREEK SB	PARKS HIGHWAY	696.5	37.4	AC	0.3%	90	1.6%*	448*
2116	SPRING CREEK NB	PARKS HIGHWAY	819.9	37.4	AC	0.7%	219	0.5%*	155*
2117	GLENN PARKS OVERHEAD SB	PARKS HIGHWAY	90.8	37.4	AC	0.8%	26	1.7%*	63*
2118	GLENN PARKS OVERHEAD NB	PARKS HIGHWAY	90.8	37.4	AC	1.5%	52		
2291	WASILLA OVERHEAD NB	PARKS HIGHWAY	224.8	36.0	AC	0.3%	21		
2311	MONTANA OVERHEAD	PARKS HIGHWAY	145.0	40.0	none	0.2%	9	2.6%*	160*
2312	SUNSHINE OVERHEAD	PARKS HIGHWAY	137.0	40.0	none	0.2%	14	3.4%*	196*

*Includes subsurface patching detected by Infrared Thermography

APPENDIX C - Aerial IR and Visual Plan-Views with Mapped Delaminations

*<u>Note: 1447 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature</u>



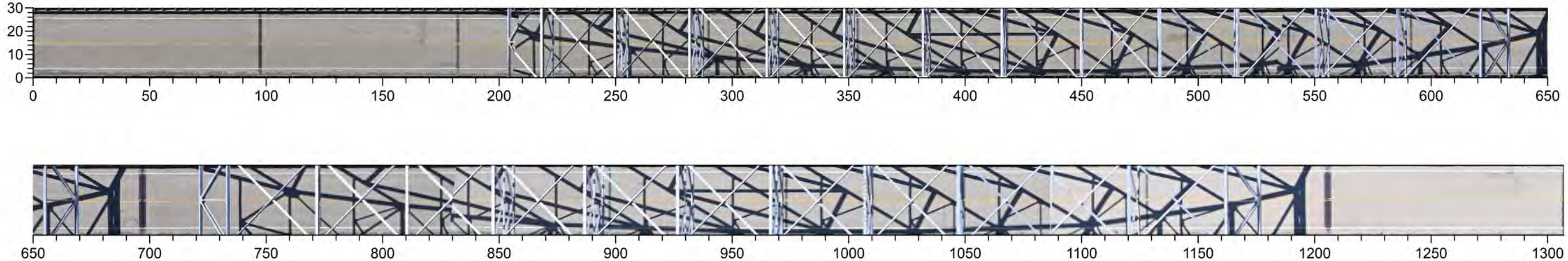


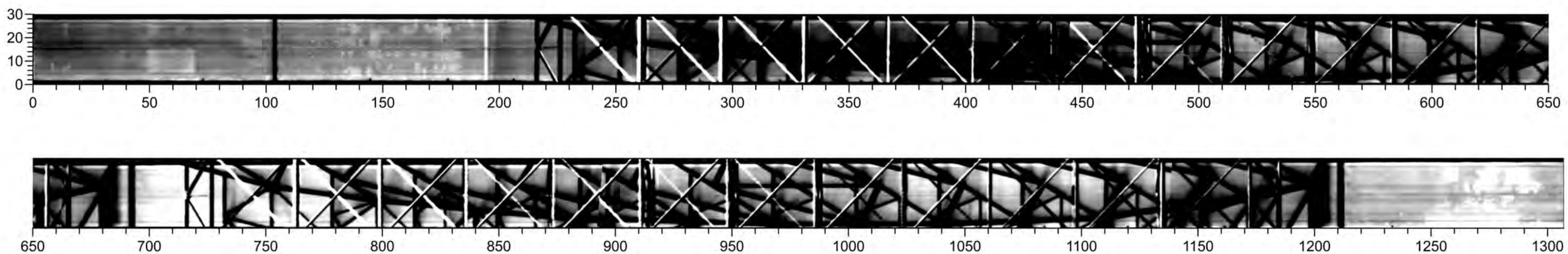
Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 45-ft 0 45		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.3	Imagery Collected: 6/15/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/12/22	Bridge No.: 0201 NORTH SLOUGH TANANA RIV PARKS HIGHWAY
			Delamination Quantity (ft^2)	233		

*Notes: Analysis limited in 29059 sq. ft. area obstructed by superstructure. If this area is removed from analysis, then the results would show 2.1% of the deck area as delaminated.

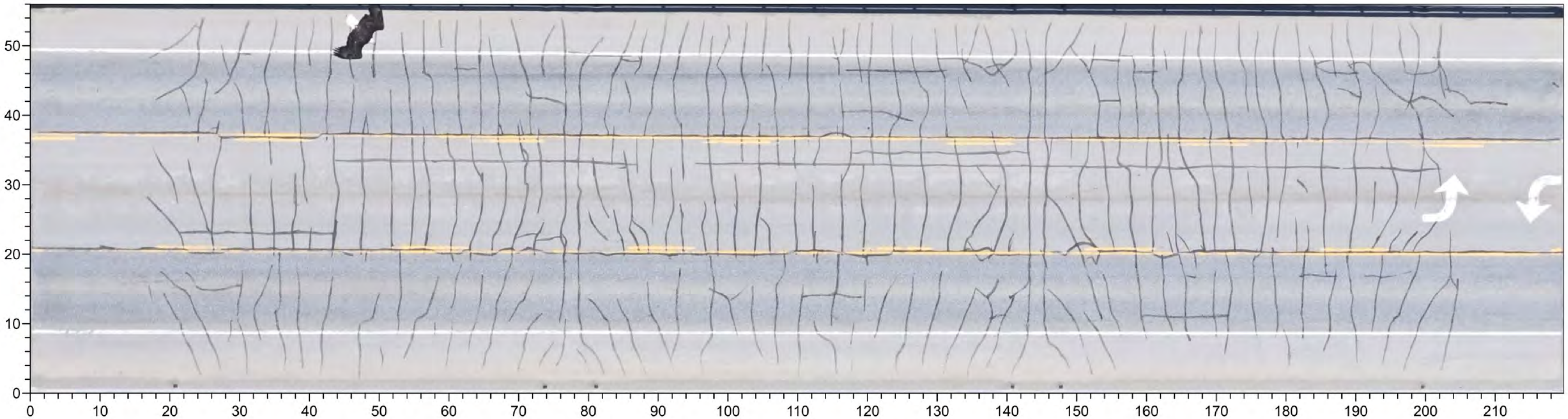
1304 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

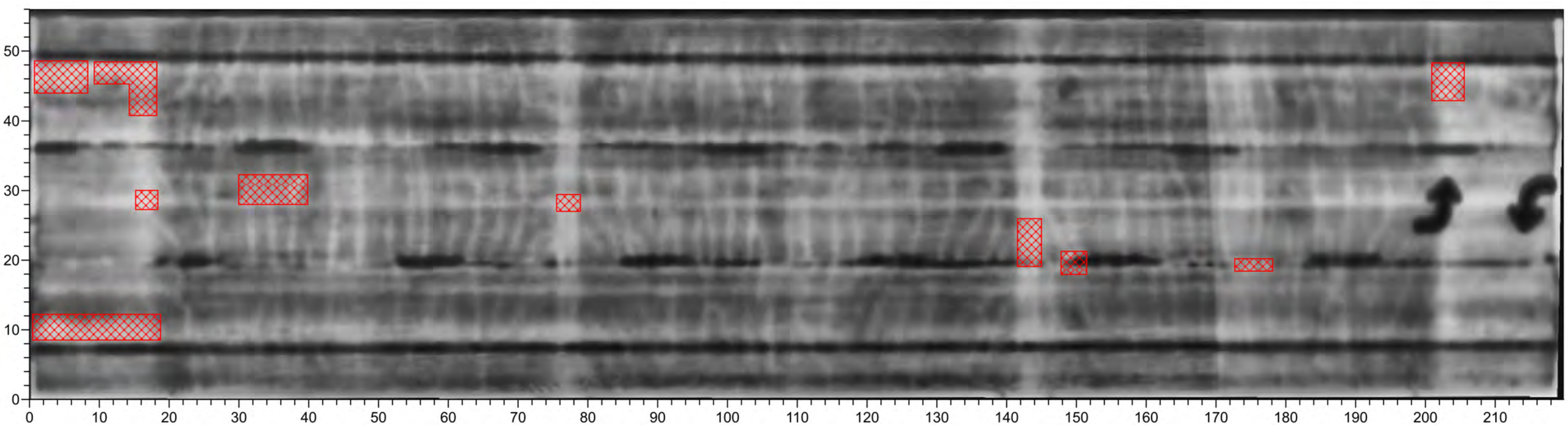




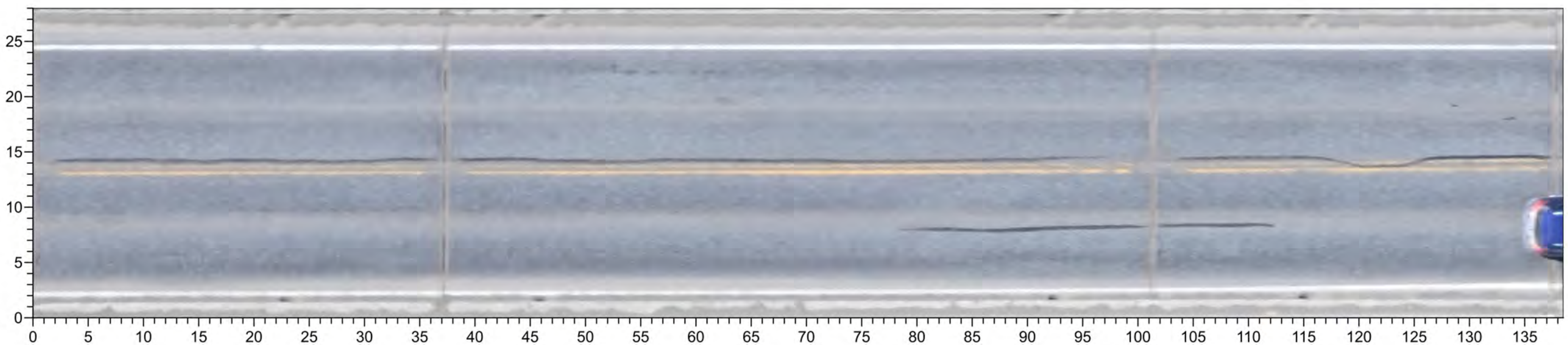
Note: Delamination locations not shown as quantity is less than 2%.

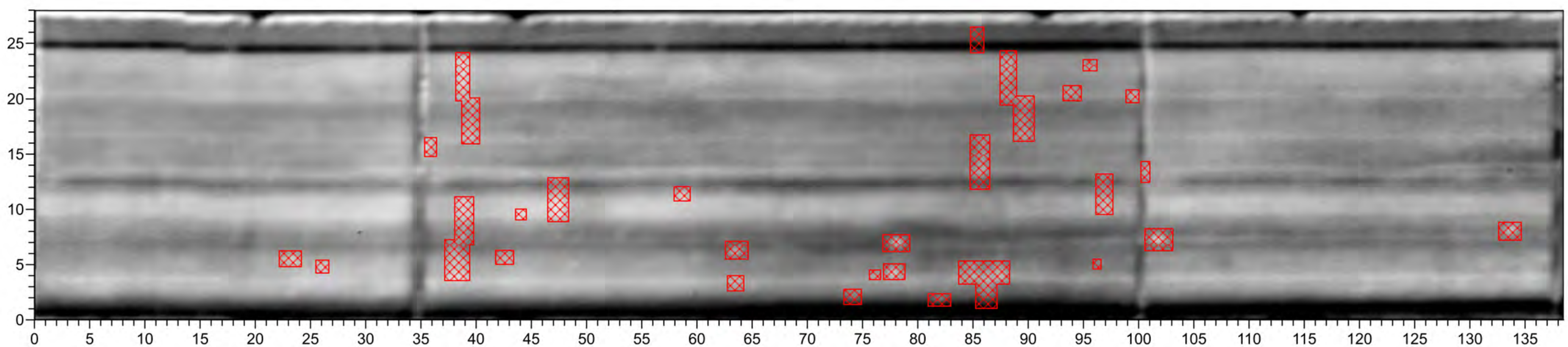
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 45-ft 0 45		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.5	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/12/22	Bridge No.: 0202 TANANA RIVER AT NENANA PARKS HIGHWAY
			Delamination Quantity (ft^2)	214		



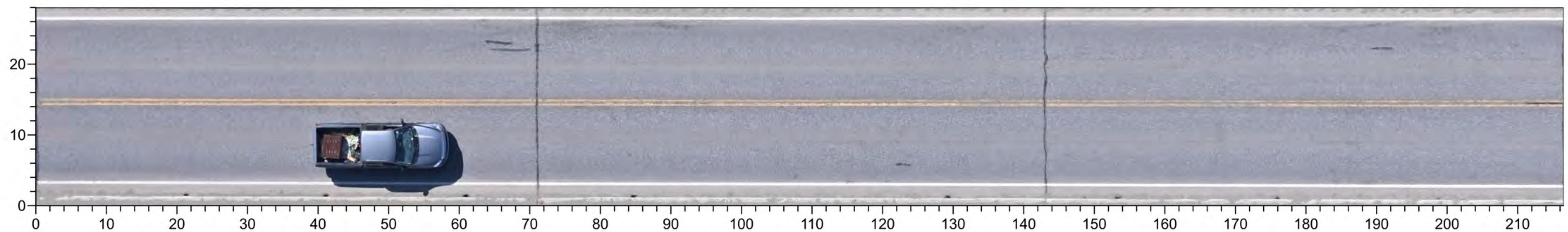


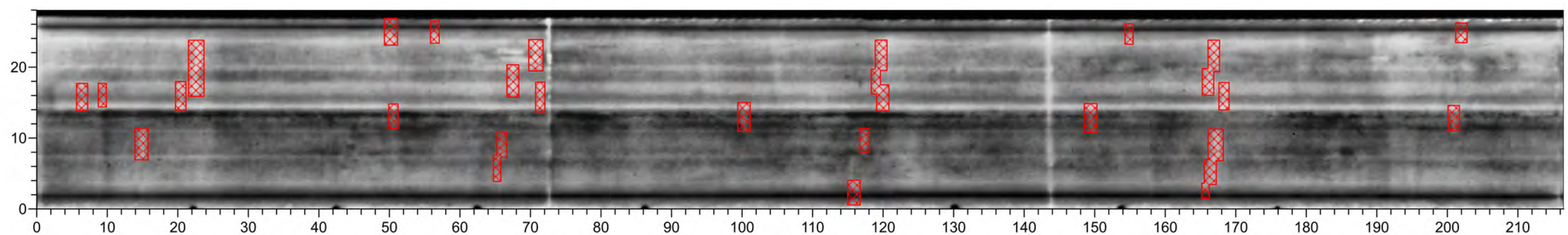
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.3	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 9/30/22	Bridge No.: 0210 WILLOW CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	280		



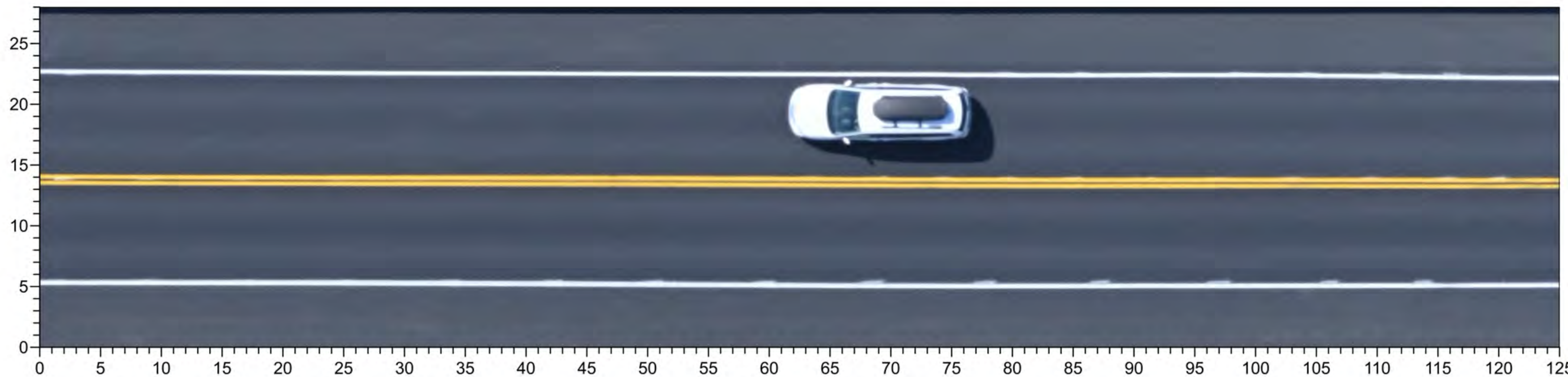


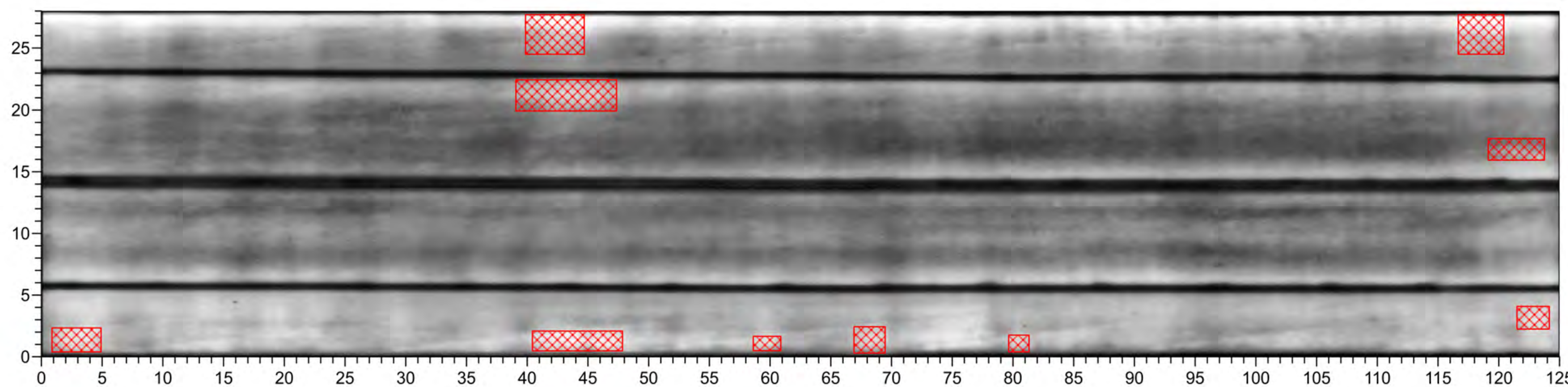
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.2	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 9/30/22	Bridge No.: 0211 LITTLE WILLOW CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	125		



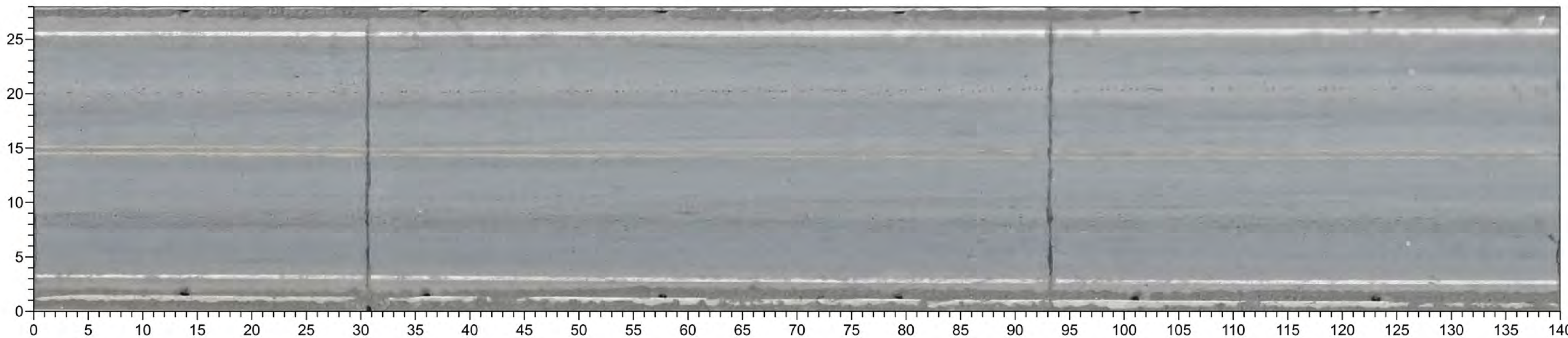


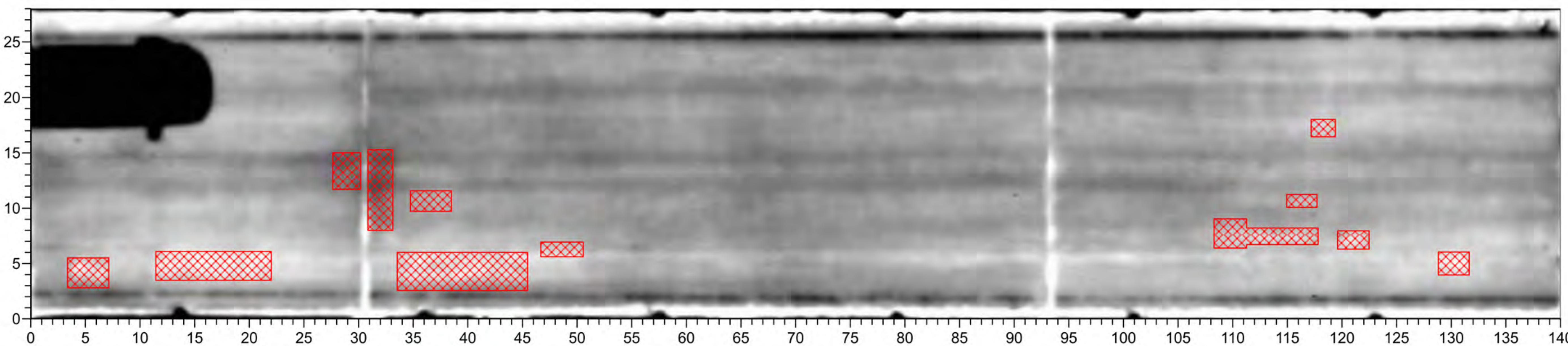
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.0	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 9/30/22	Bridge No.: 0212 KASHWITNA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	181		





Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.6	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 9/30/22	Bridge No.: 0213 SHEEP CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	92		

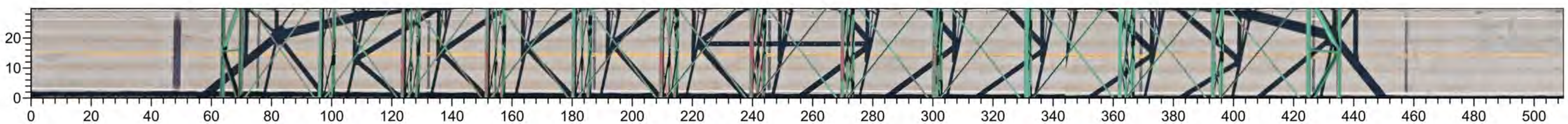


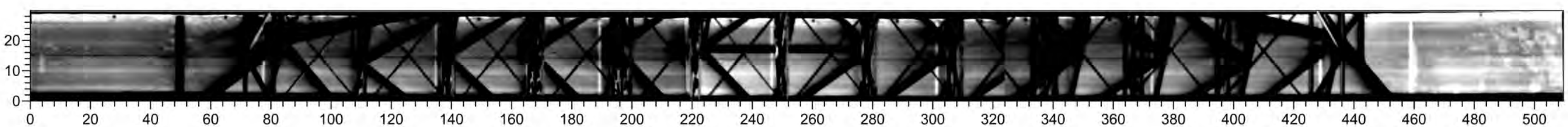


Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.9	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 9/30/22	Bridge No.: 0215 MONTANA CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	151		

*Notes: Analysis limited in 10616 sq. ft. area obstructed by superstructure. If this area is removed from analysis, then the results would show 4.7% of the deck area as delaminated.

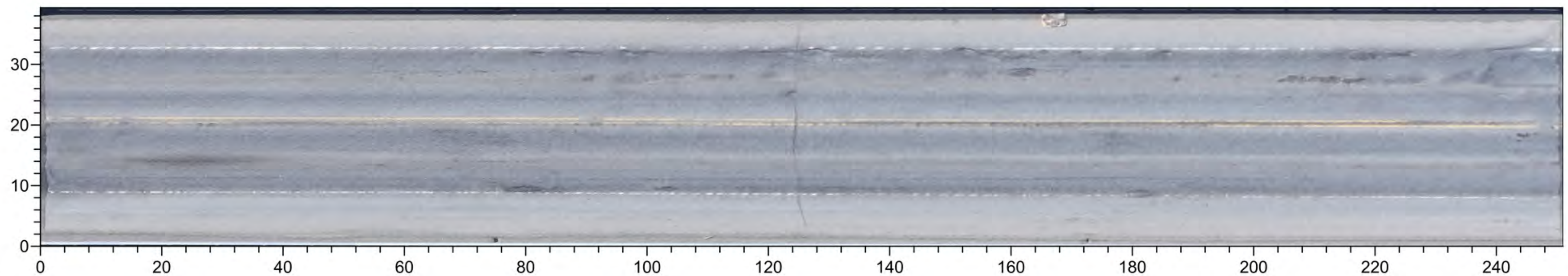
298 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

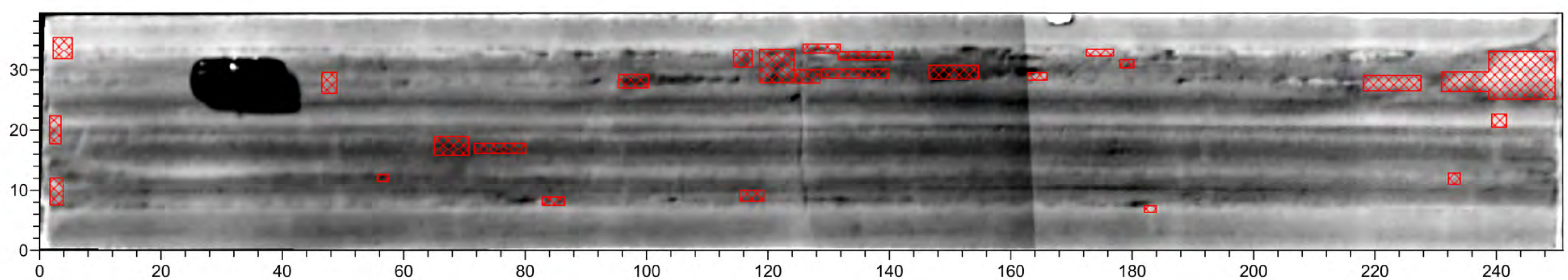




Note: Delamination locations not shown as quantity is less than 2%.

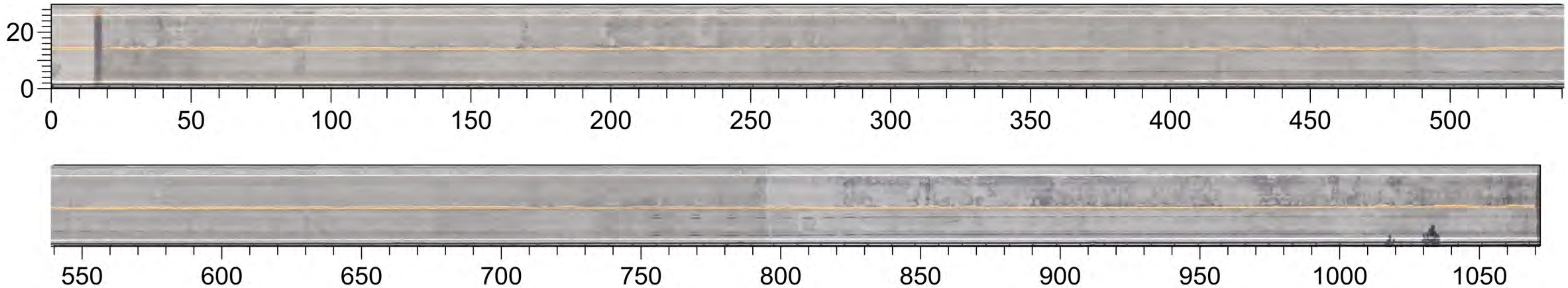
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 35-ft 0 35	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.4	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/11/22	Bridge No.: 0216 NENANA RIVER AT REX PARKS HIGHWAY
			Delamination Quantity (ft^2)	219		

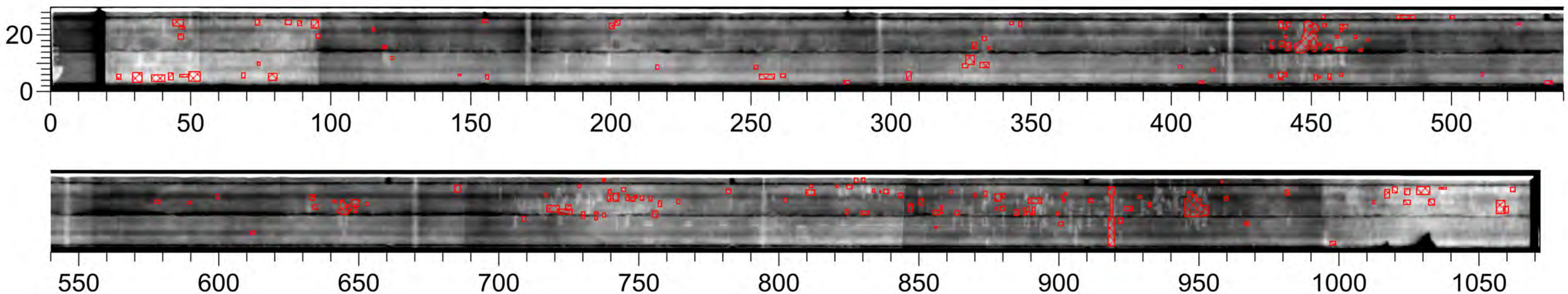




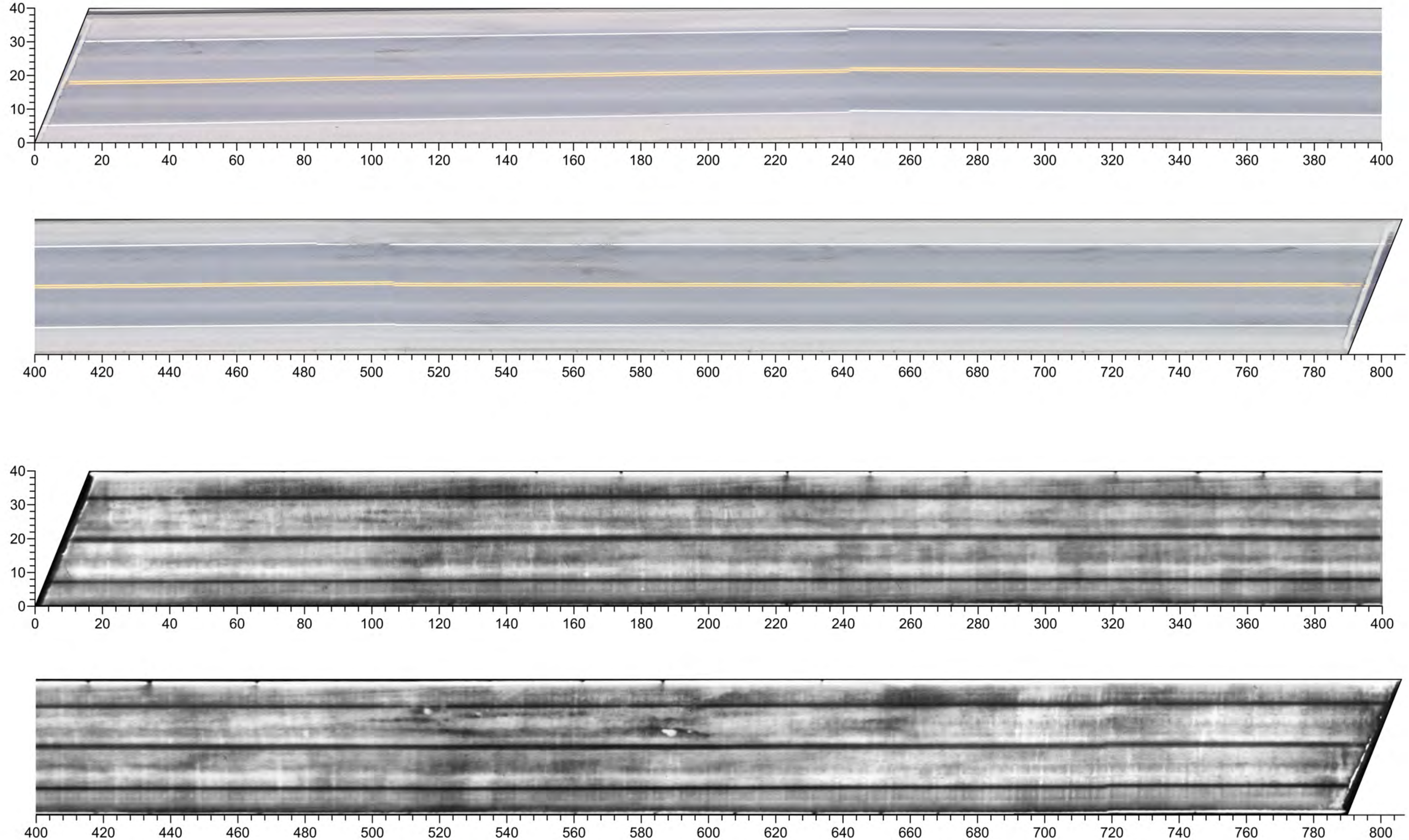
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.7	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/2/22	Bridge No.: 0240 LITTLE SUSITNA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	361		

*Note: 948 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature



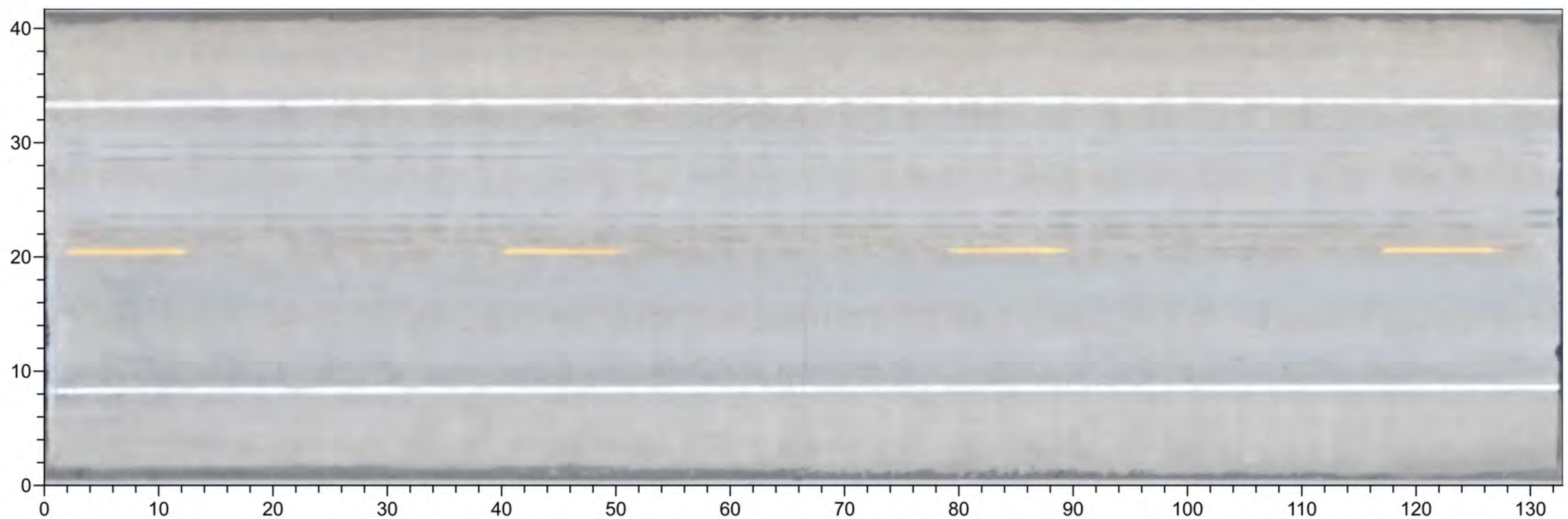


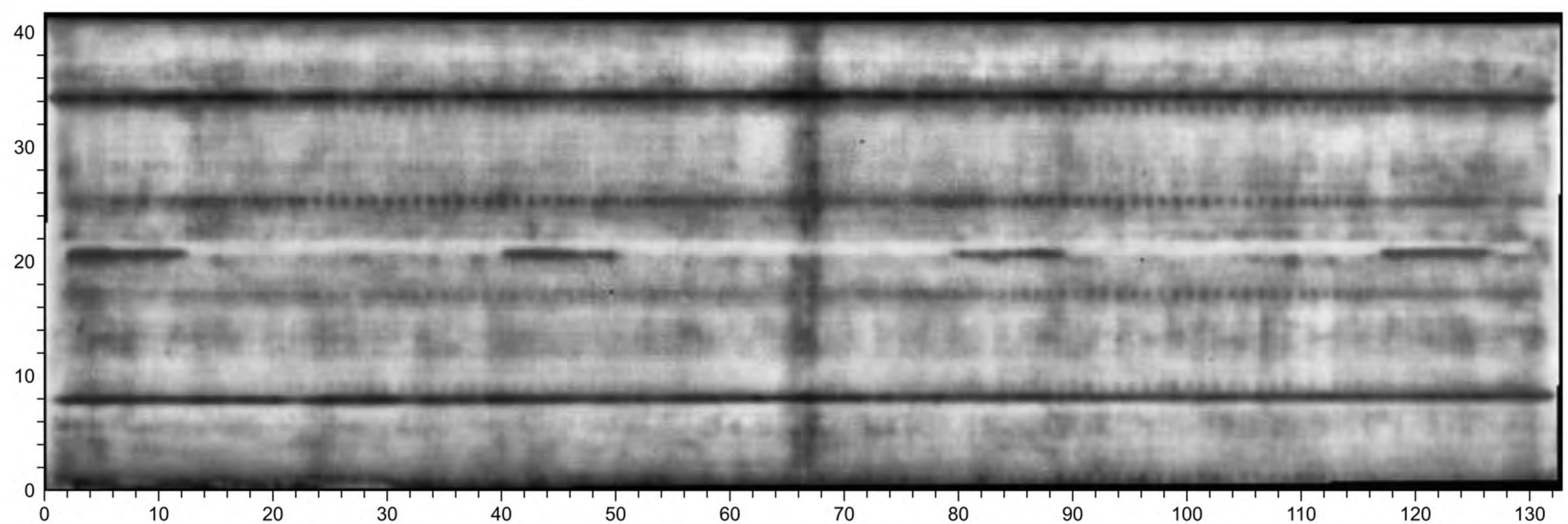
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 35-ft 0 35		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.1	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/12/22	Bridge No.: 0254 SUSITNA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	660		



Note: Delamination locations not shown as quantity is less than 2%.

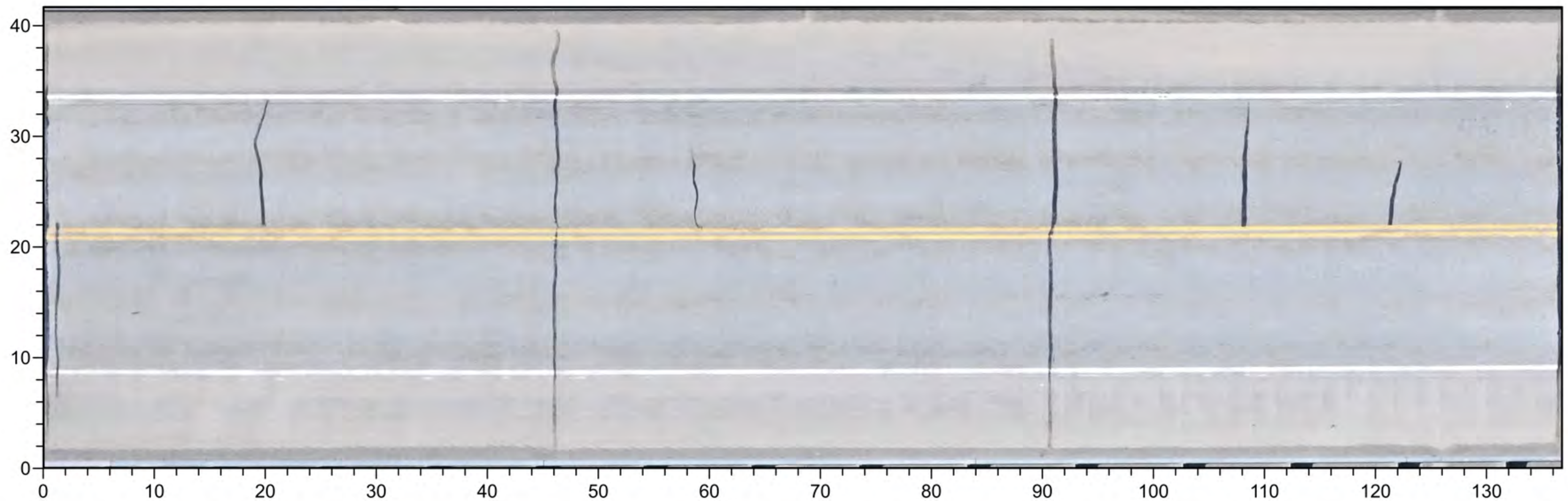
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 30-ft 0 30		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.1	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/2/22	Bridge No.: 0255 CHULITNA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	355		

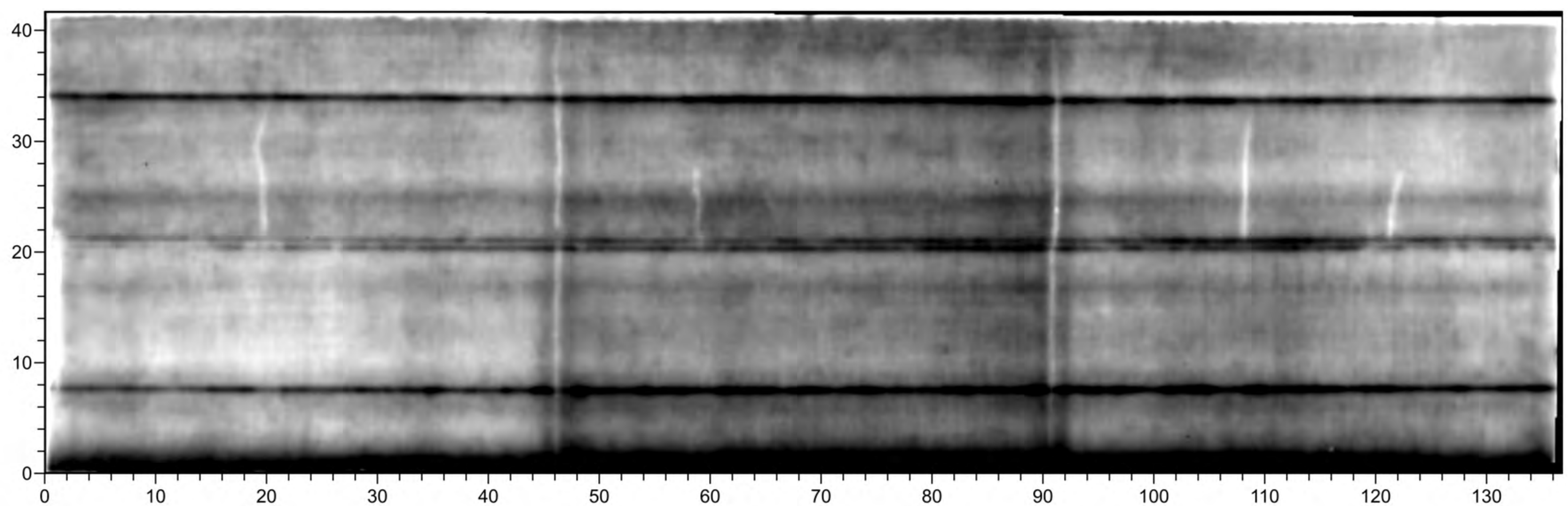




Note: Delamination locations not shown as quantity is less than 2%.

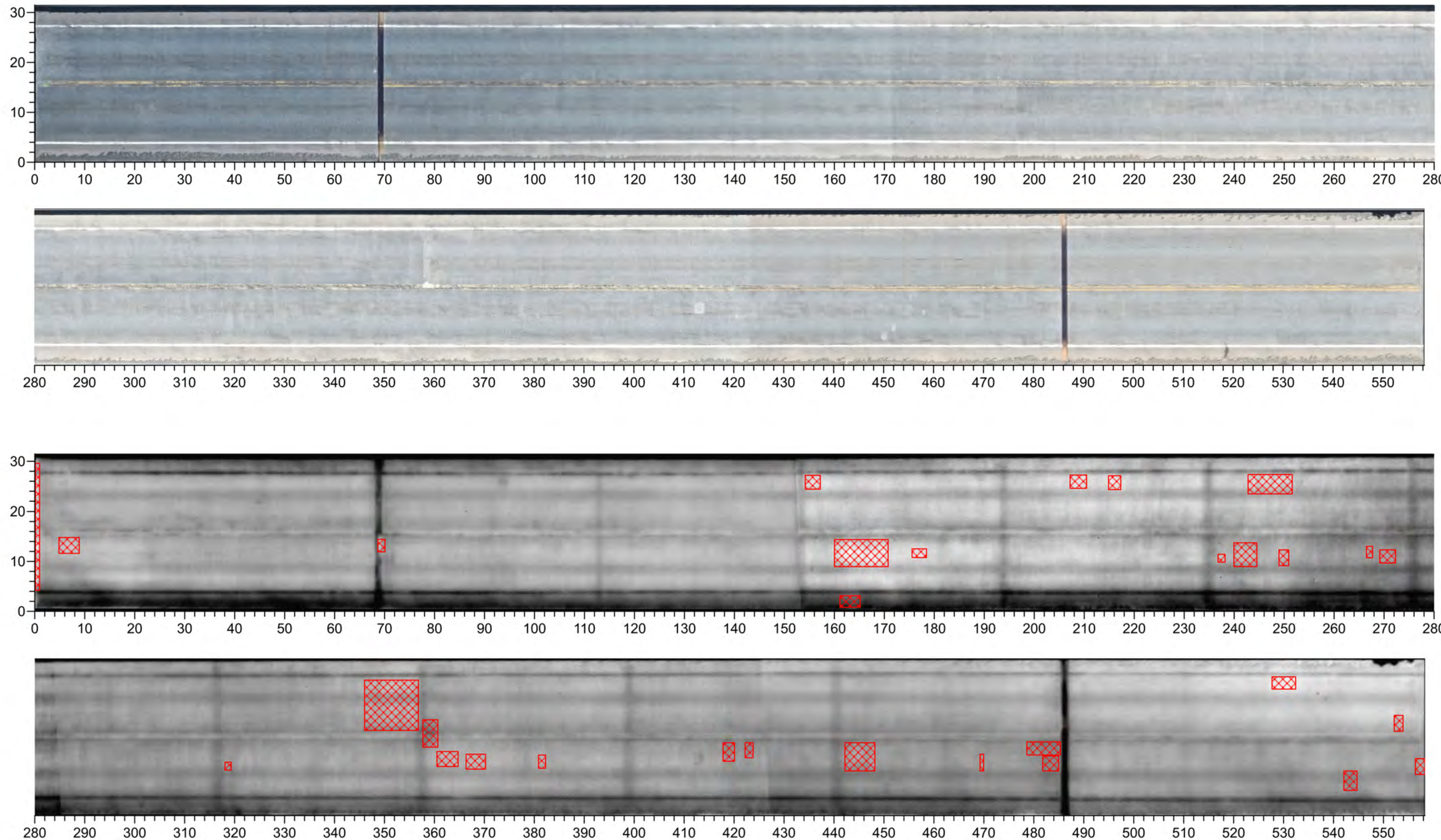
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.9	Imagery Collected: 6/4/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0256 TROUBLESOME CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	49		



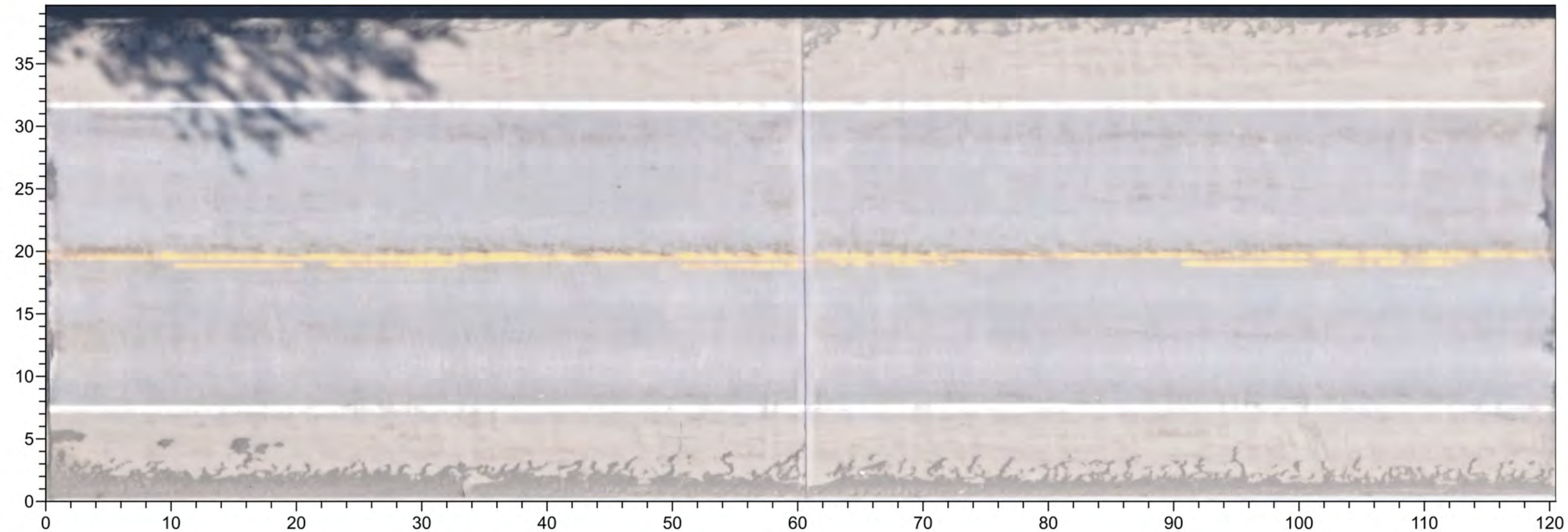


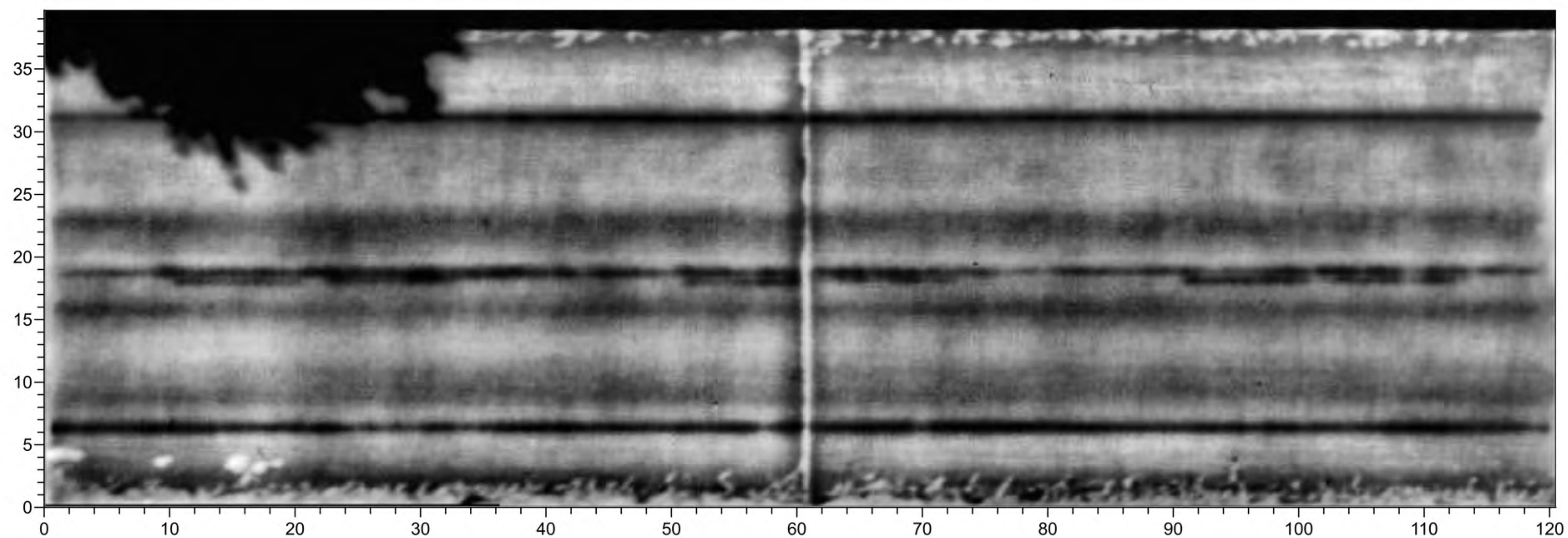
Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.6	Imagery Collected: 6/4/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 0257 BYERS CREEK PARKS HIGHWAY
			Delamination Quantity (ft²)	32		



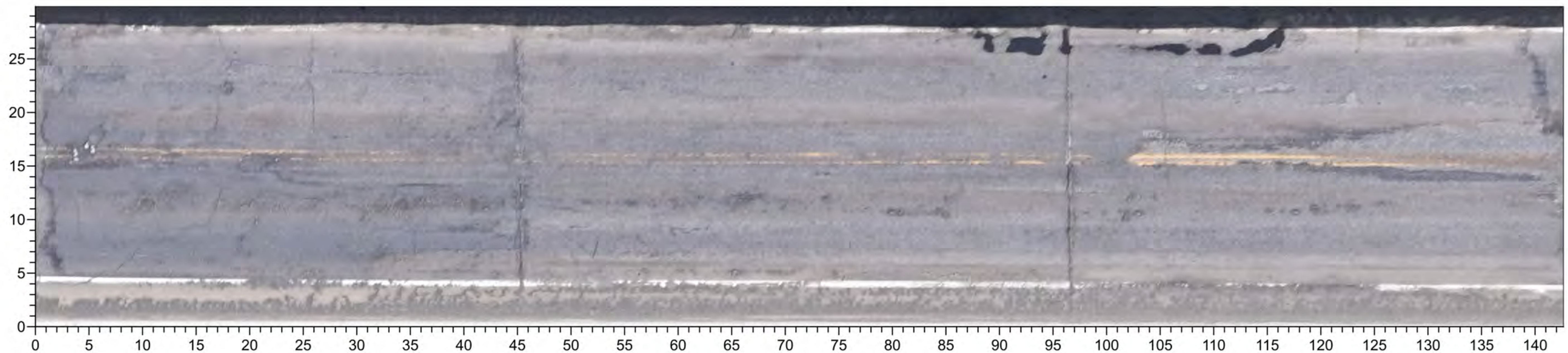
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.7	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0258 HURRICANE GULCH PARKS HIGHWAY
			Delamination Quantity (ft^2)	477		

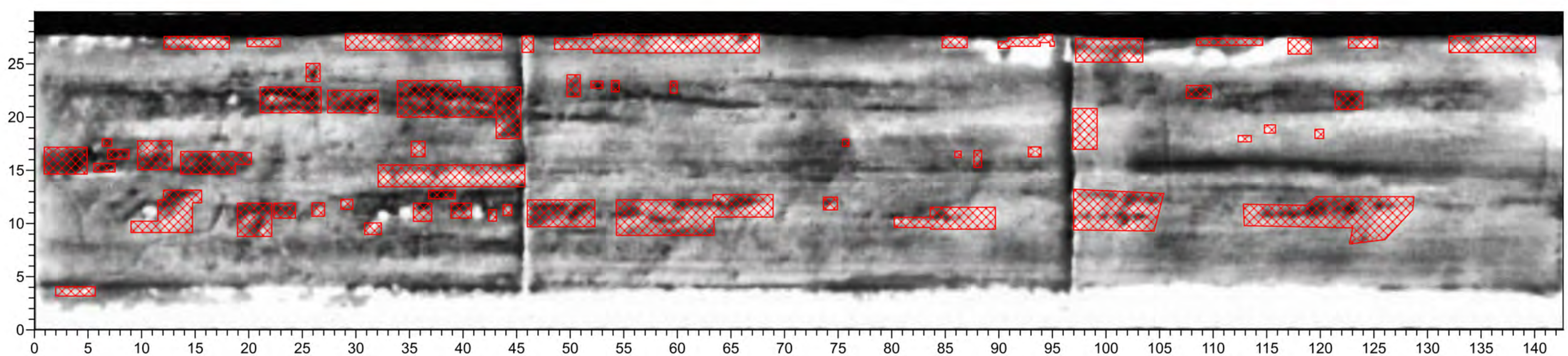




Note: Delamination locations not shown as quantity is less than 2%.

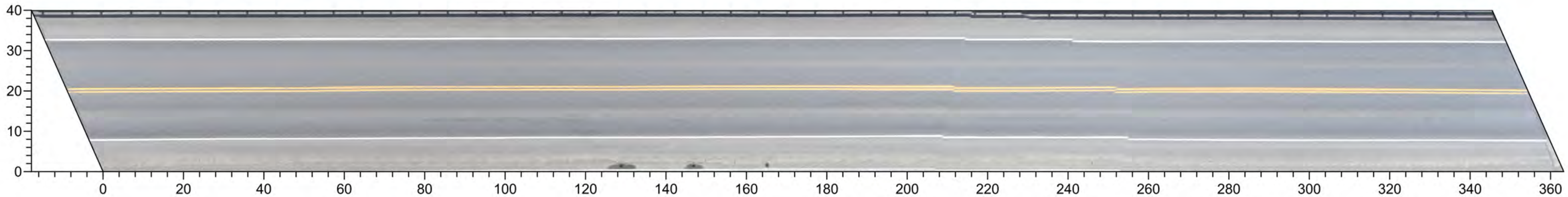
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.8	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0259 HONOLULU CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	40		

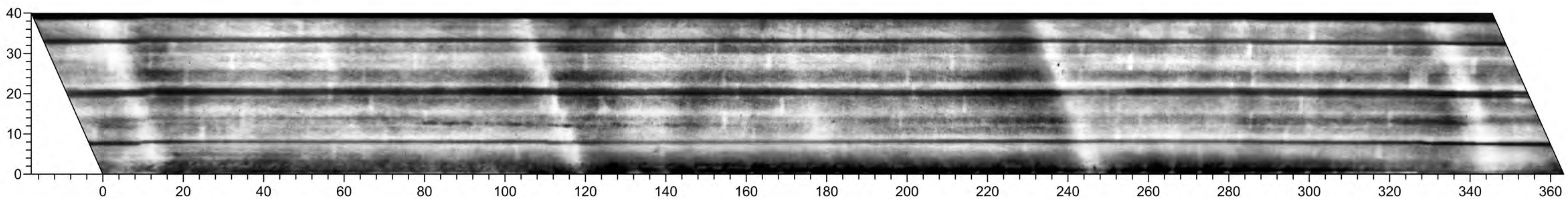




Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10	N ⇒	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	10.8	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0260 EAST FORK CHULITNA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	461		

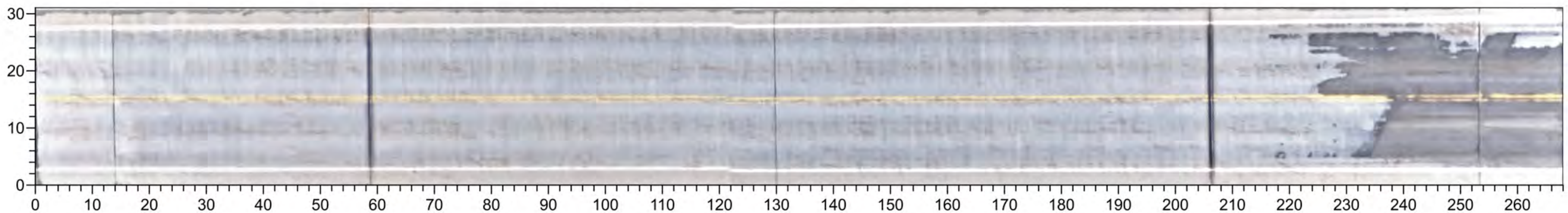
*Note: 294 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

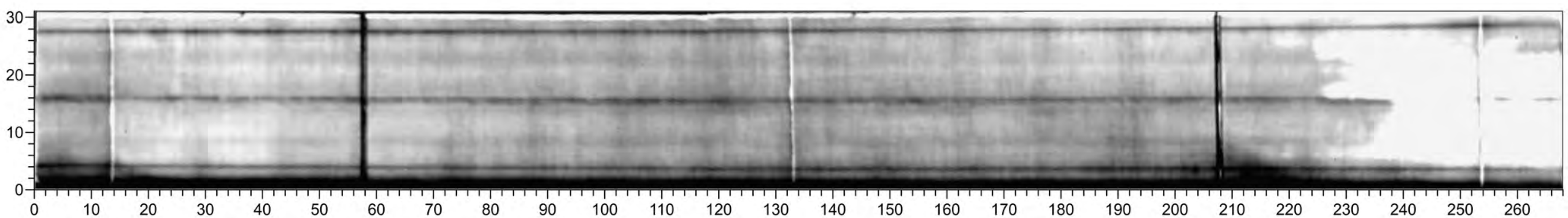




Note: Delamination locations not shown as quantity is less than 2%.

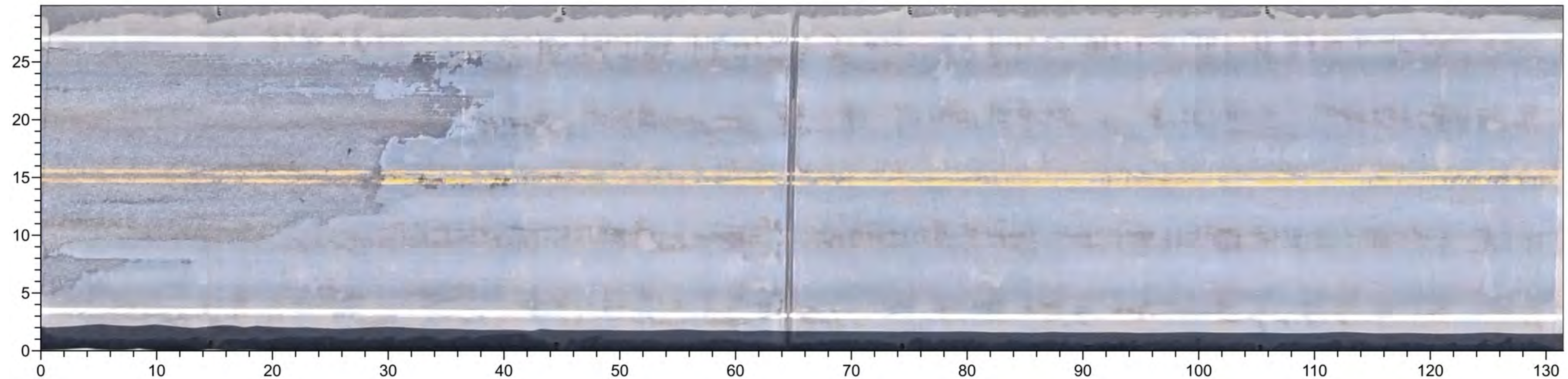
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 25-ft 0 25		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.2	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0261 MIDDLE FORK CHULITNA RIV PARKS HIGHWAY
			Delamination Quantity (ft^2)	23		

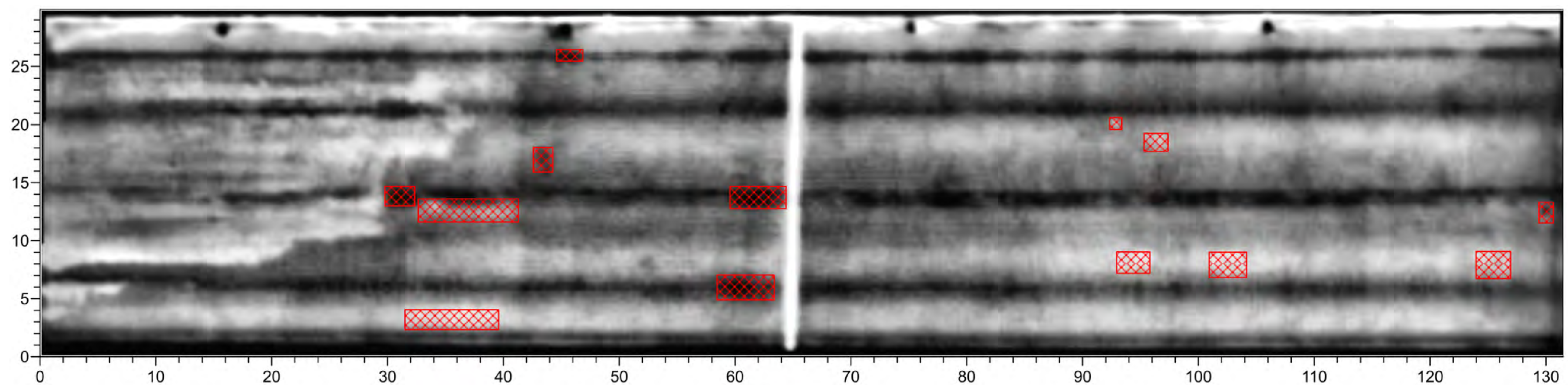




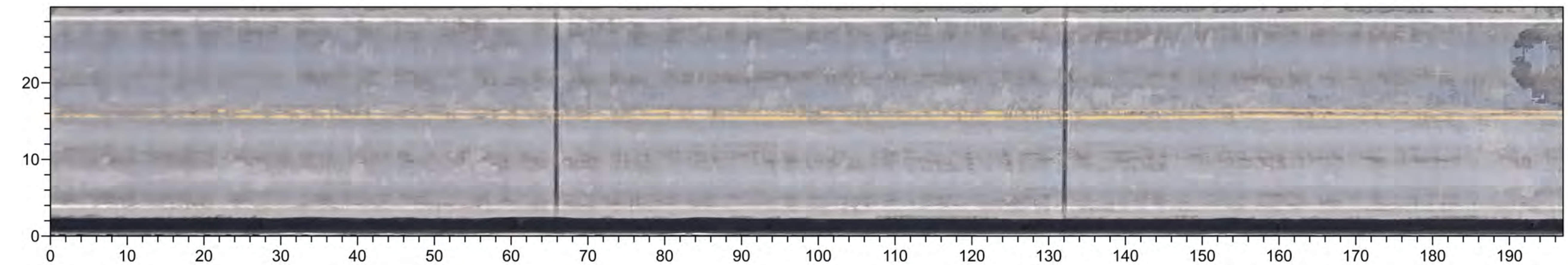
Note: Delamination locations not shown as quantity is less than 2%.

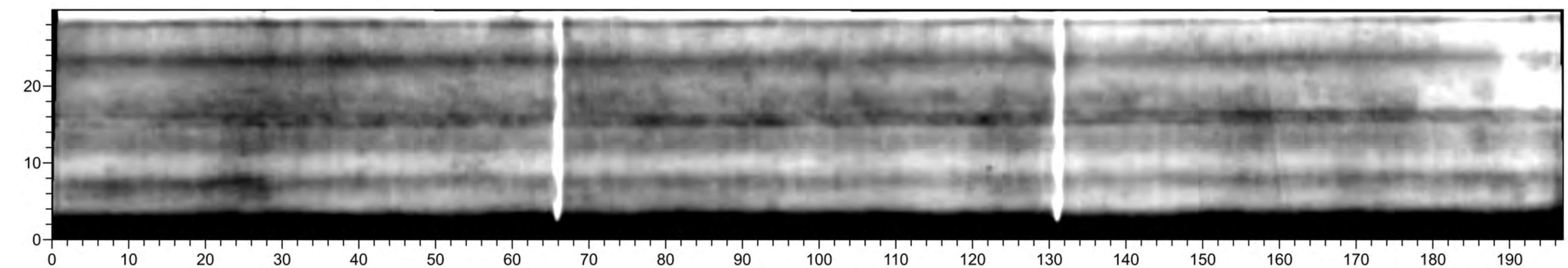
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.4	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0262 LITTLE COAL CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	117		





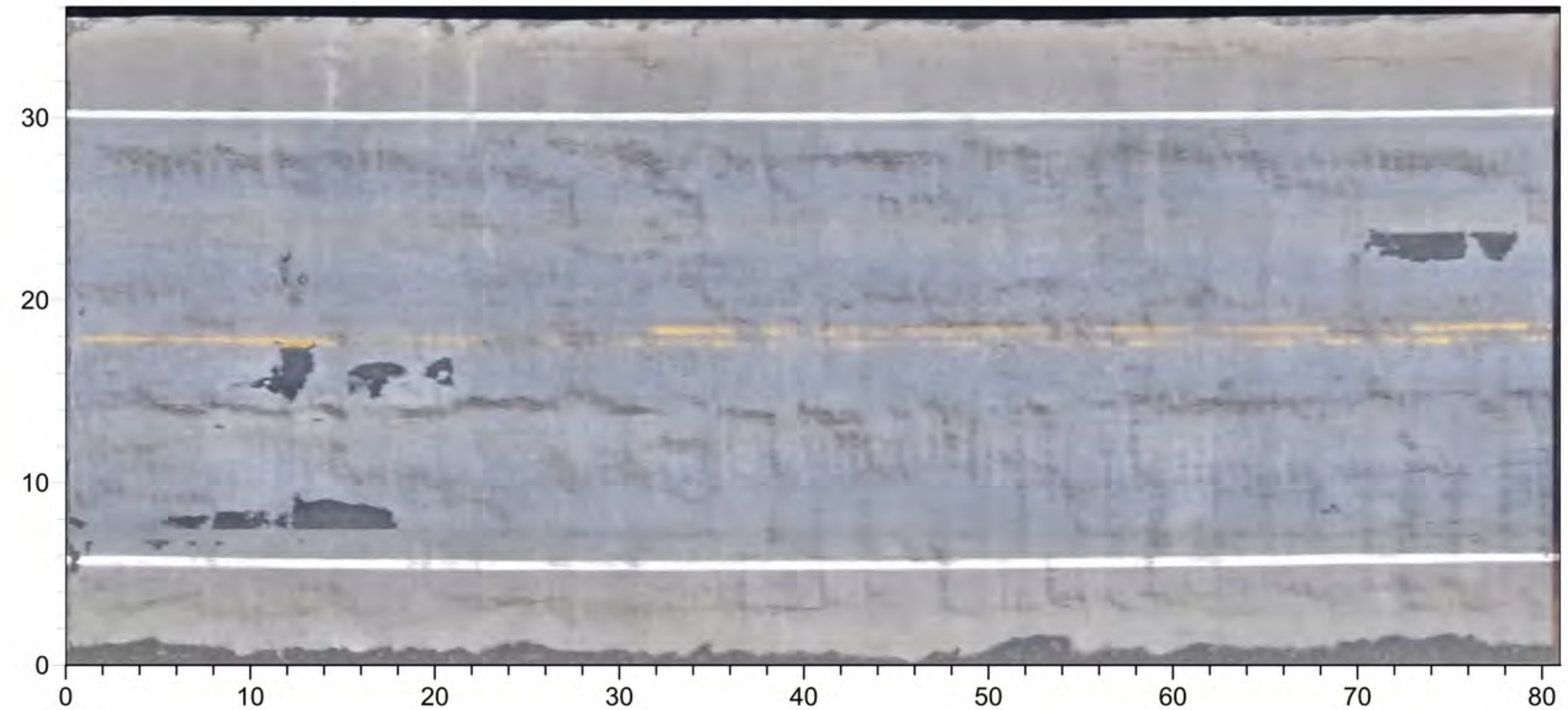
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.2	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0293 PASS CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	87		

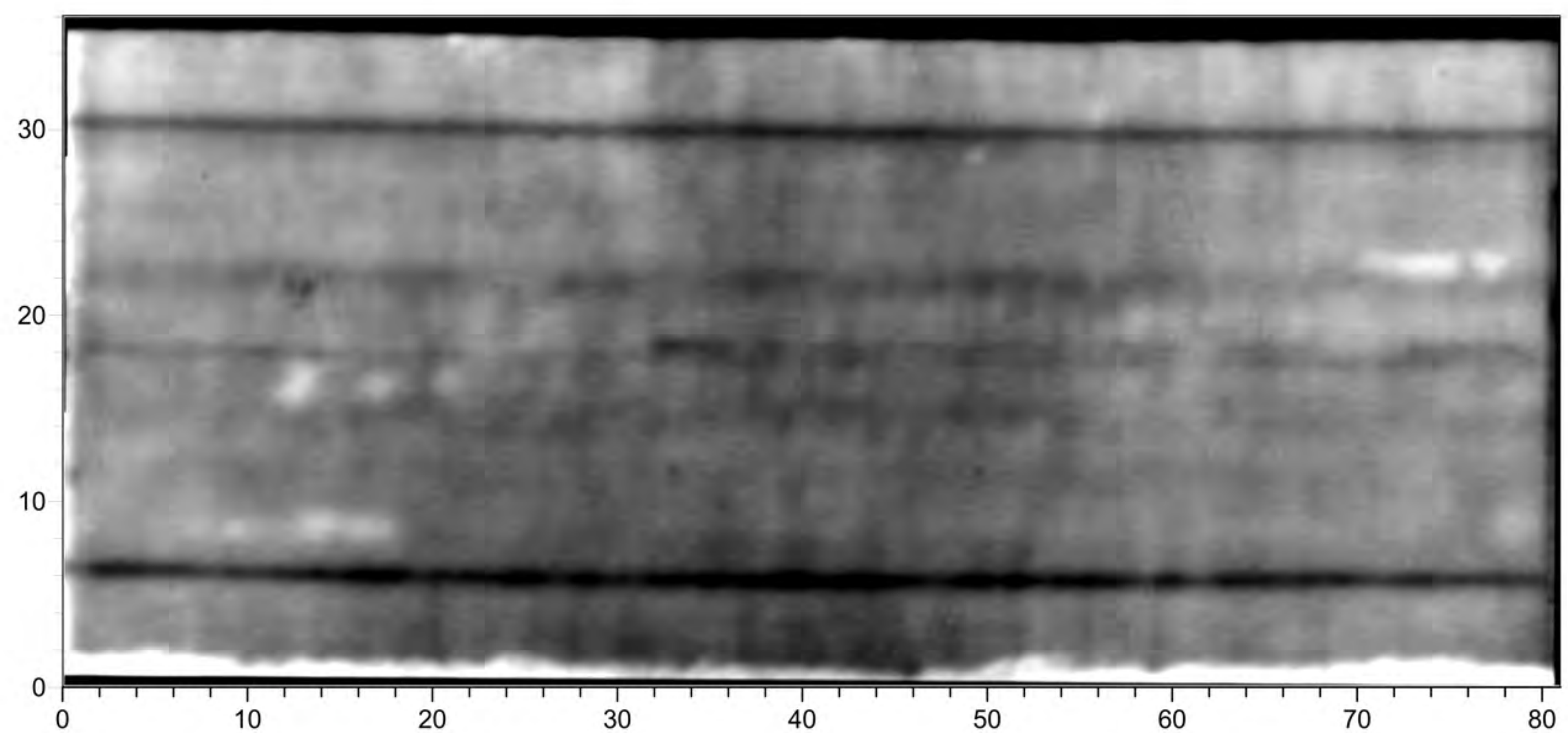




Note: Delamination locations not shown as quantity is less than 2%.

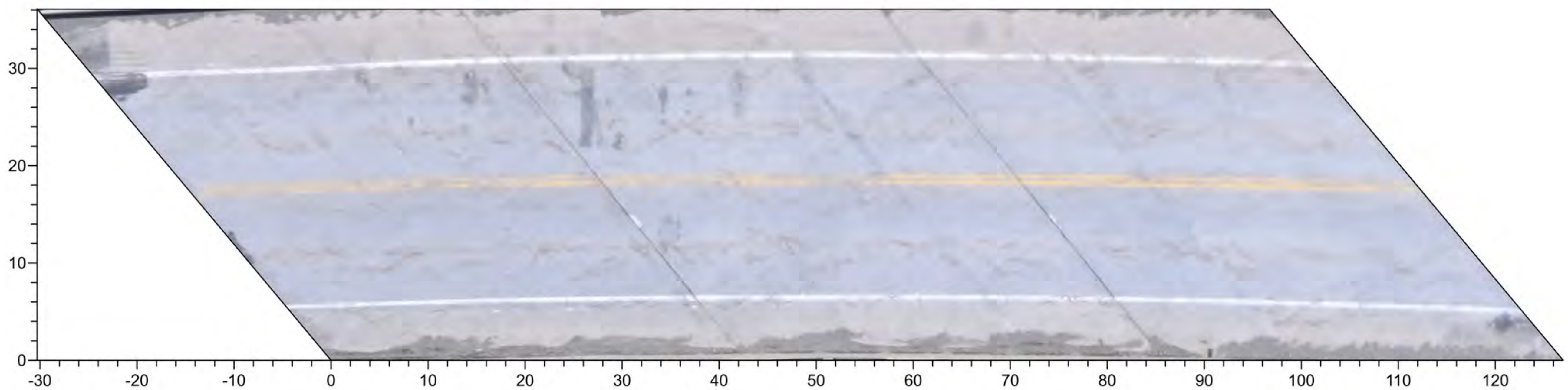
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.1	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/6/22	Bridge No.: 0302 JACK RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	65		

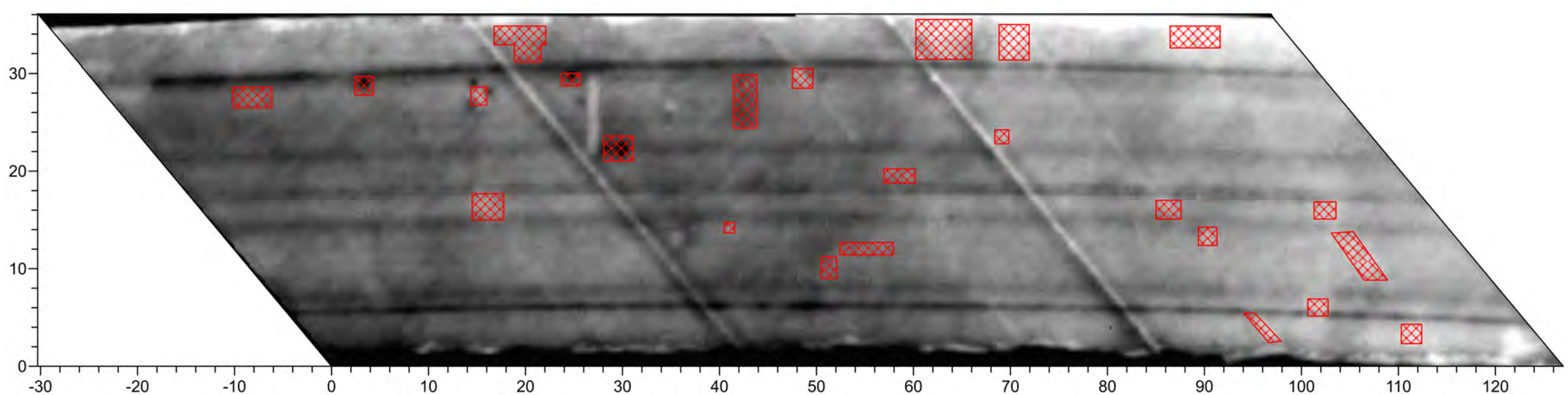




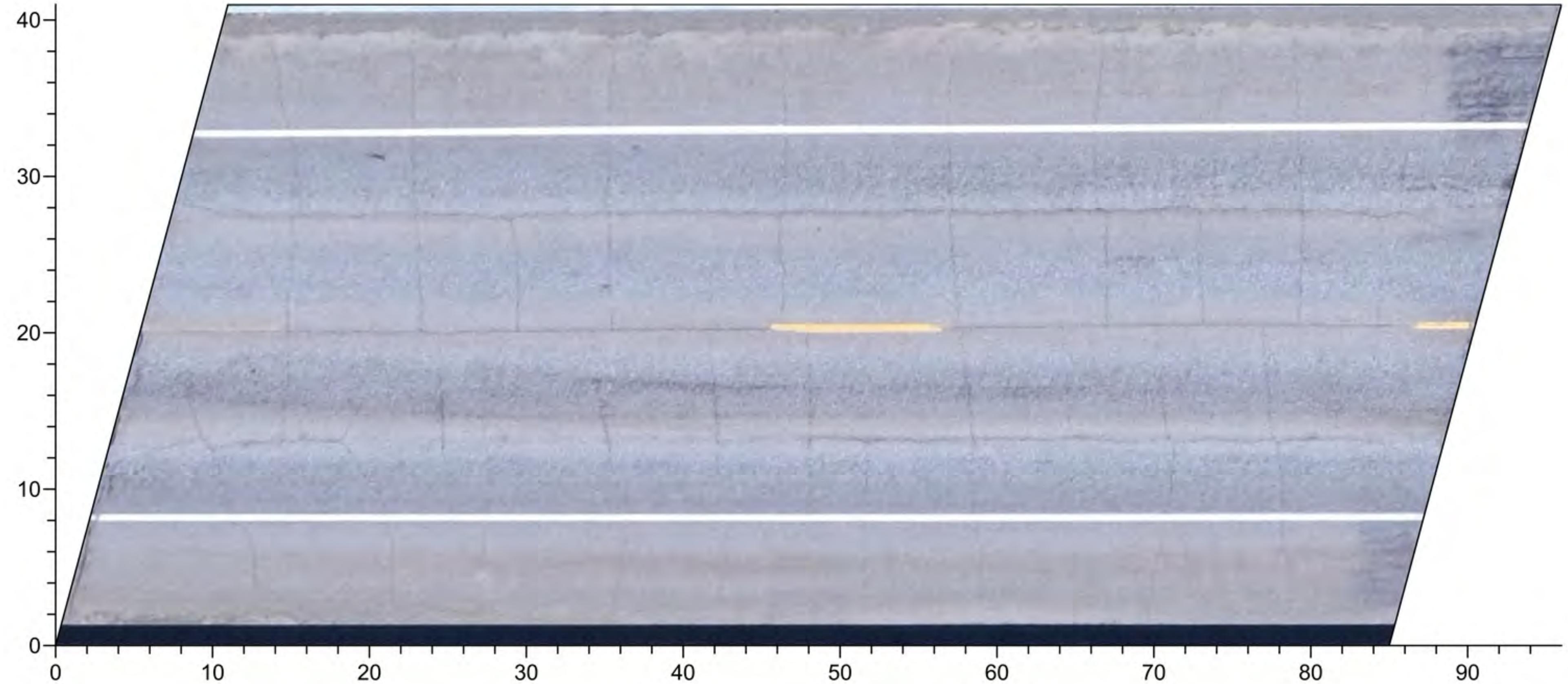
Note: Delamination locations not shown as quantity is less than 2%.

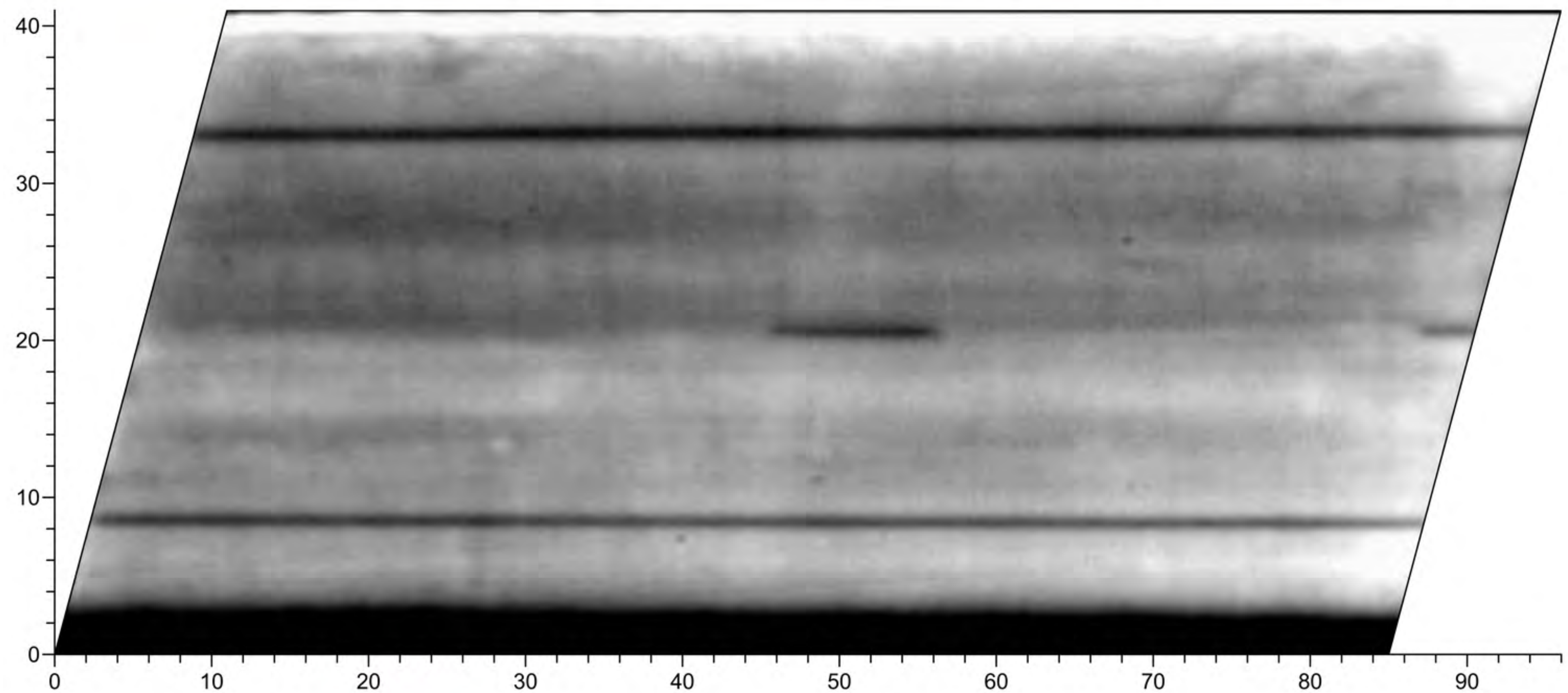
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.8	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/6/22	Bridge No.: 0311 BEAR CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	52.6		





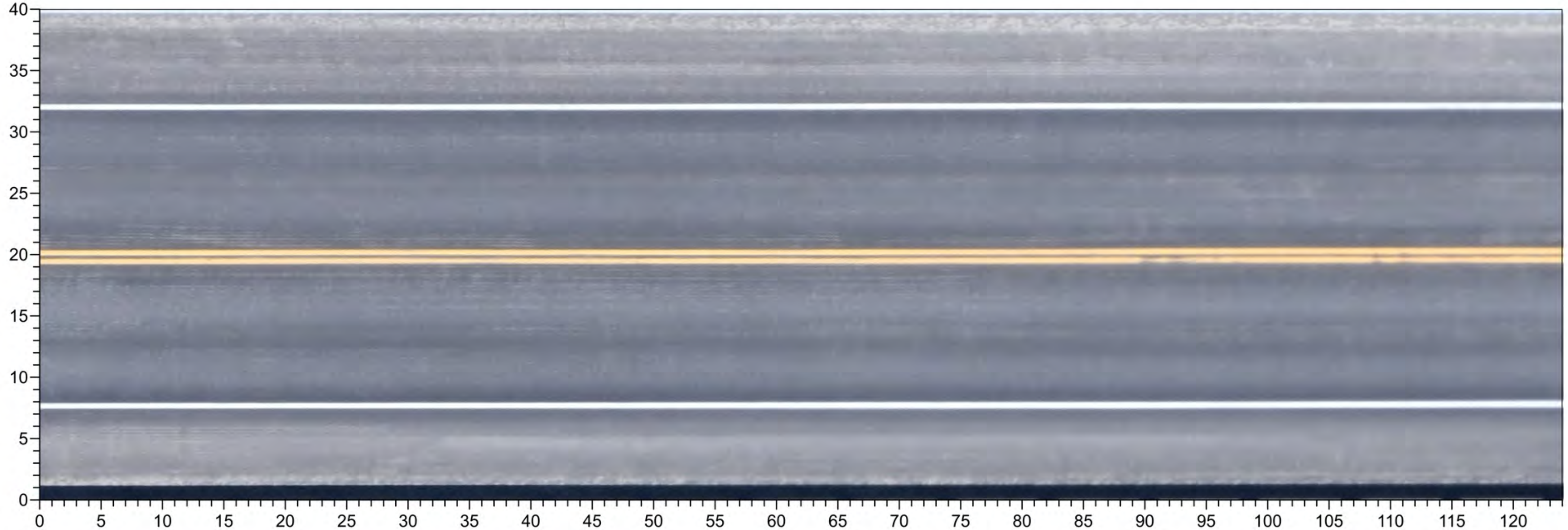
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.7	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0313 PANGUINGUE CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	168		

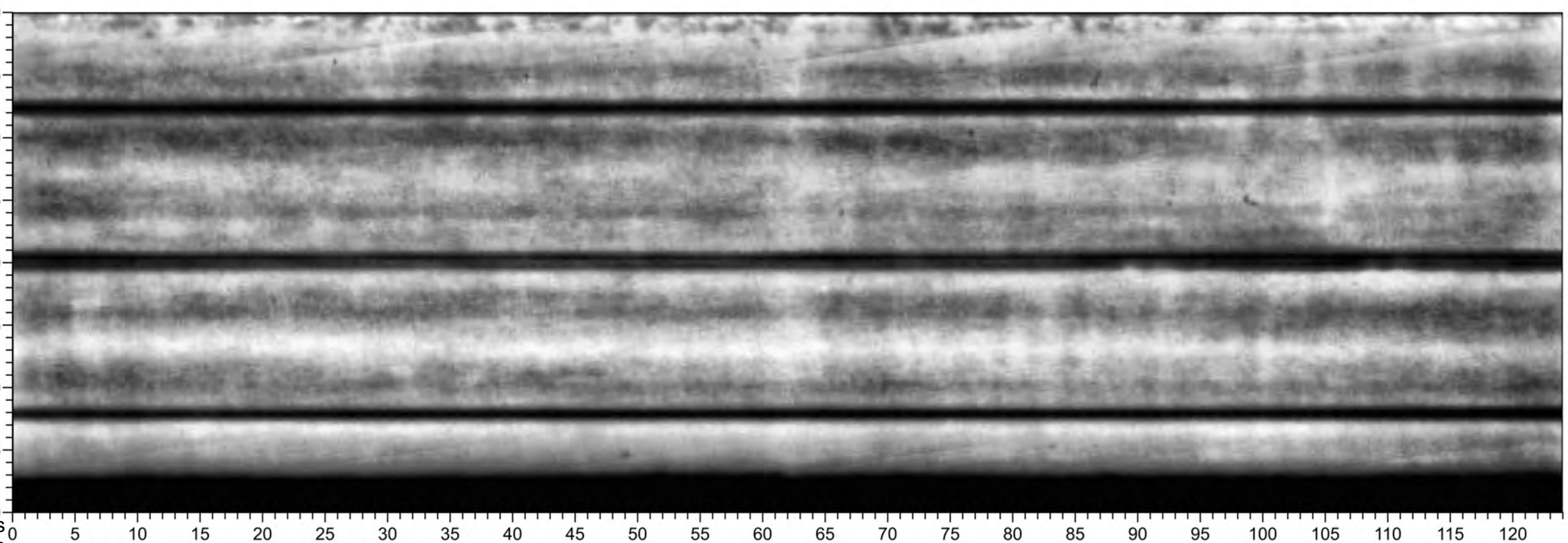




Note: Delamination locations
not shown as quantity is less than 2%.

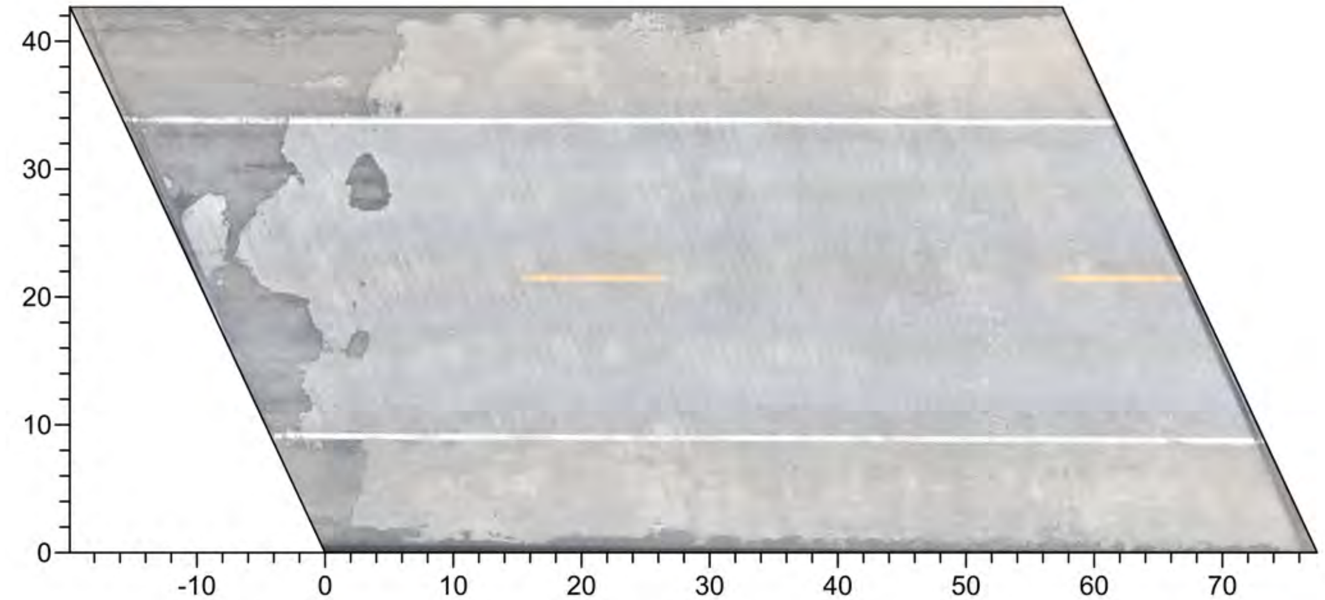
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.2	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0317 JULIUS CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	8		

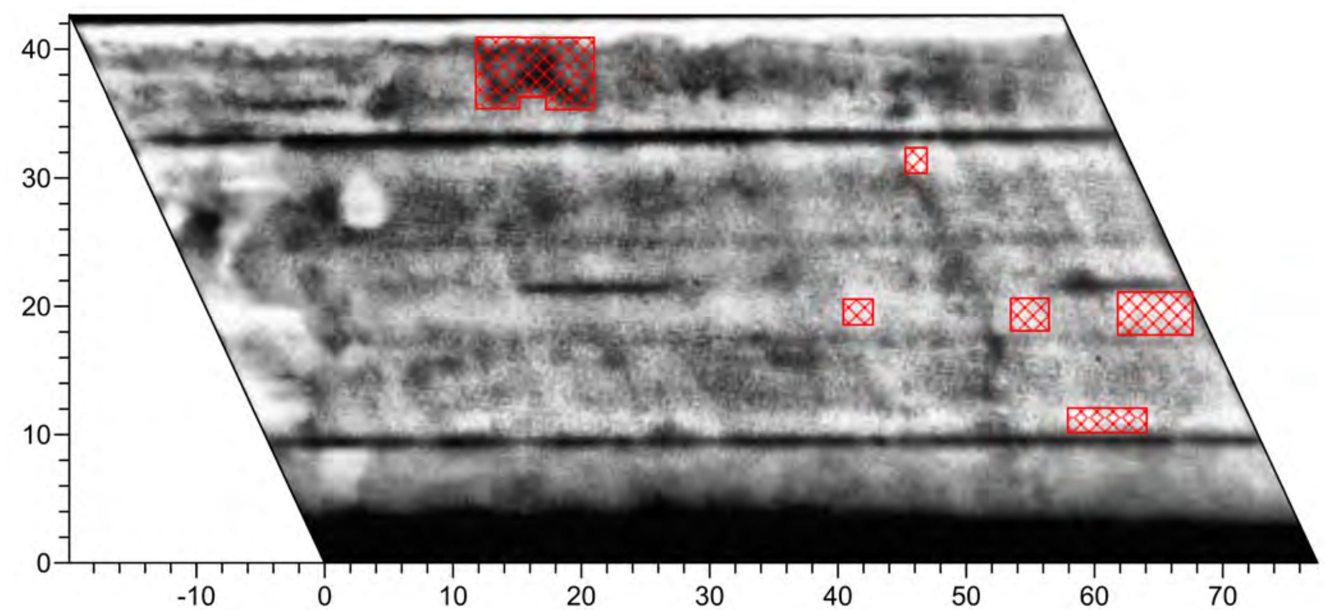




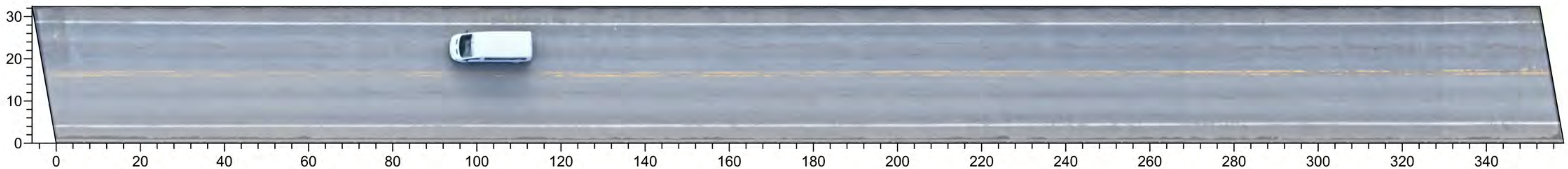
Note: Delamination locations not shown as quantity is less than 2%.

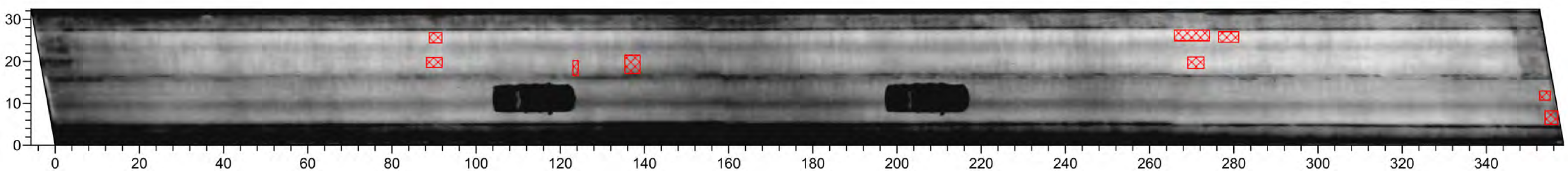
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.3	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0678 LITTLE GOLDSTREAM CK PARKS HIGHWAY
			Delamination Quantity (ft^2)	64		



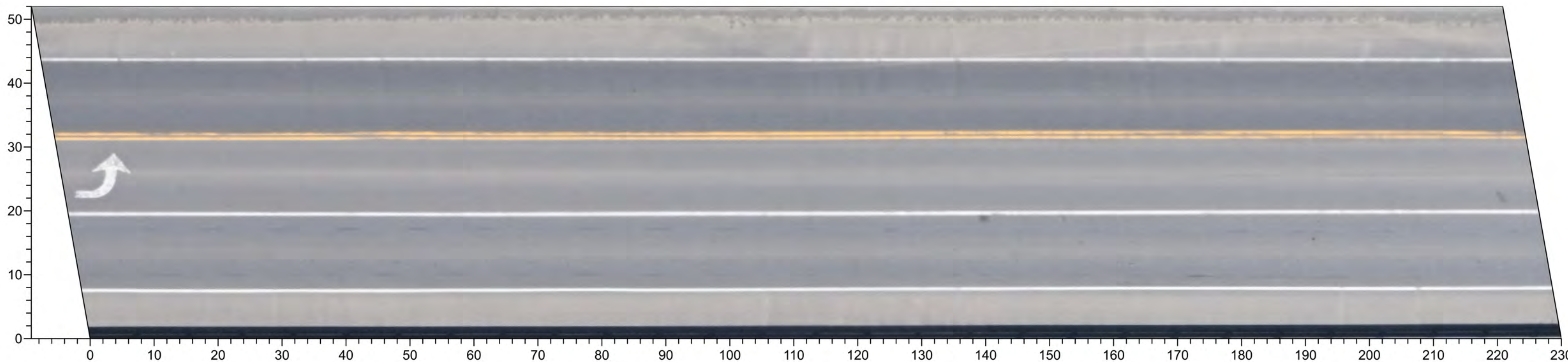


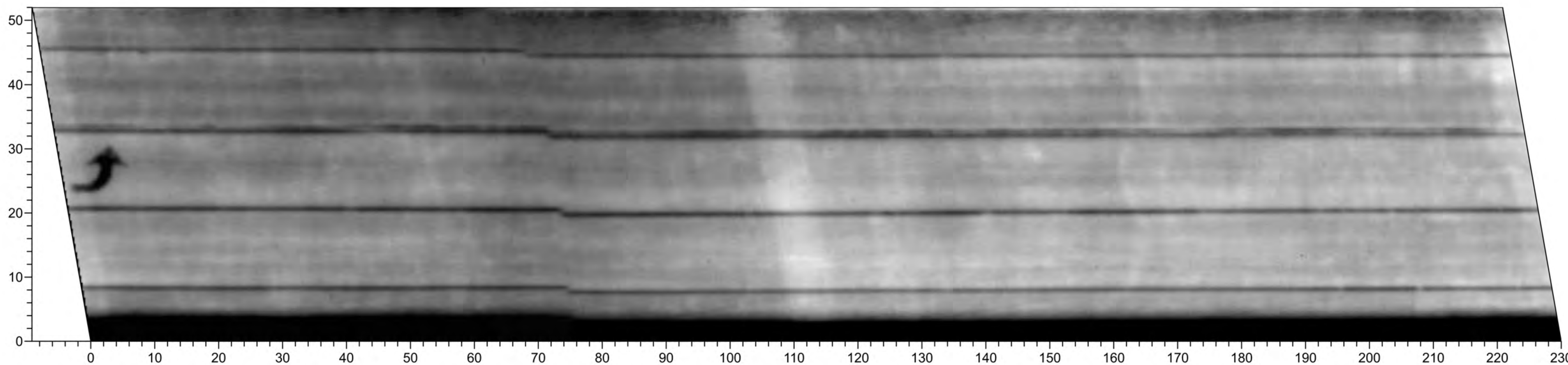
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.9	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0693 CARLO CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	96		





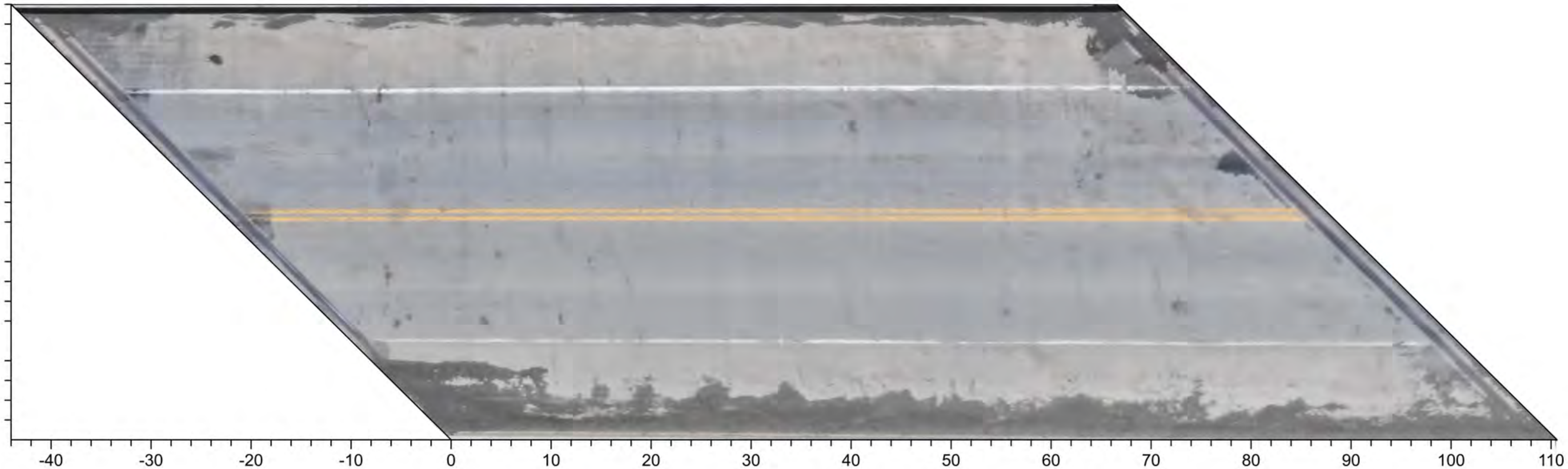
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 25-ft 0 25		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.8	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/4/22	Bridge No.: 0694 NENANA RIVER PARK BND PARKS HIGHWAY
			Delamination Quantity (ft^2)	96		

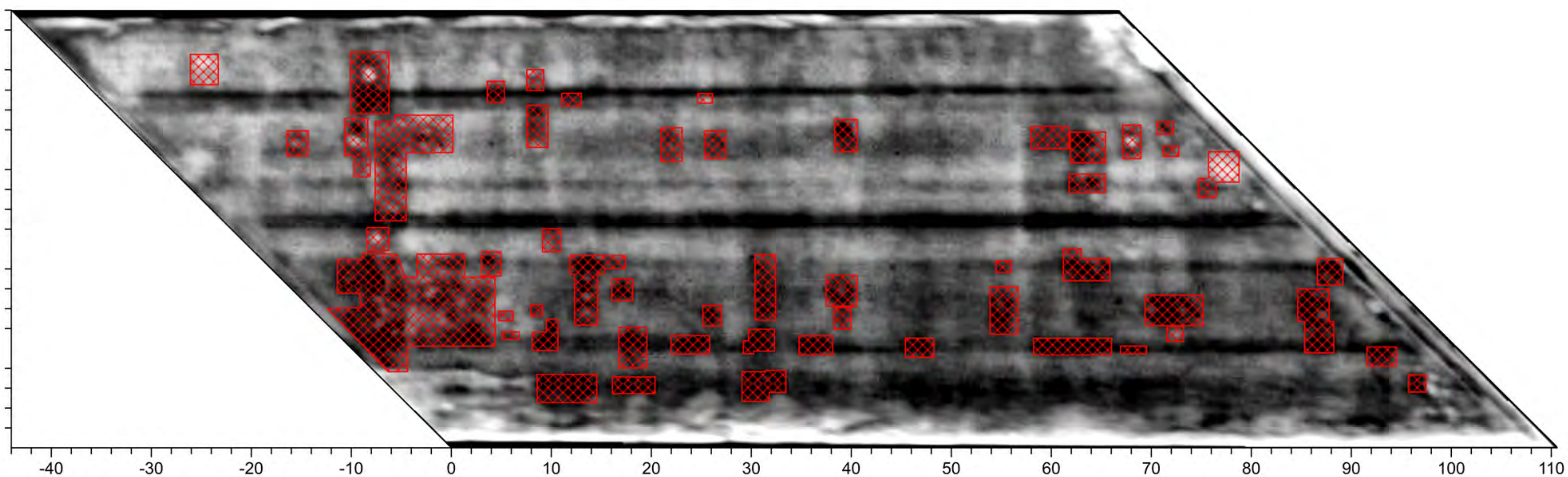




Note: Delamination locations not shown as quantity is less than 2%.

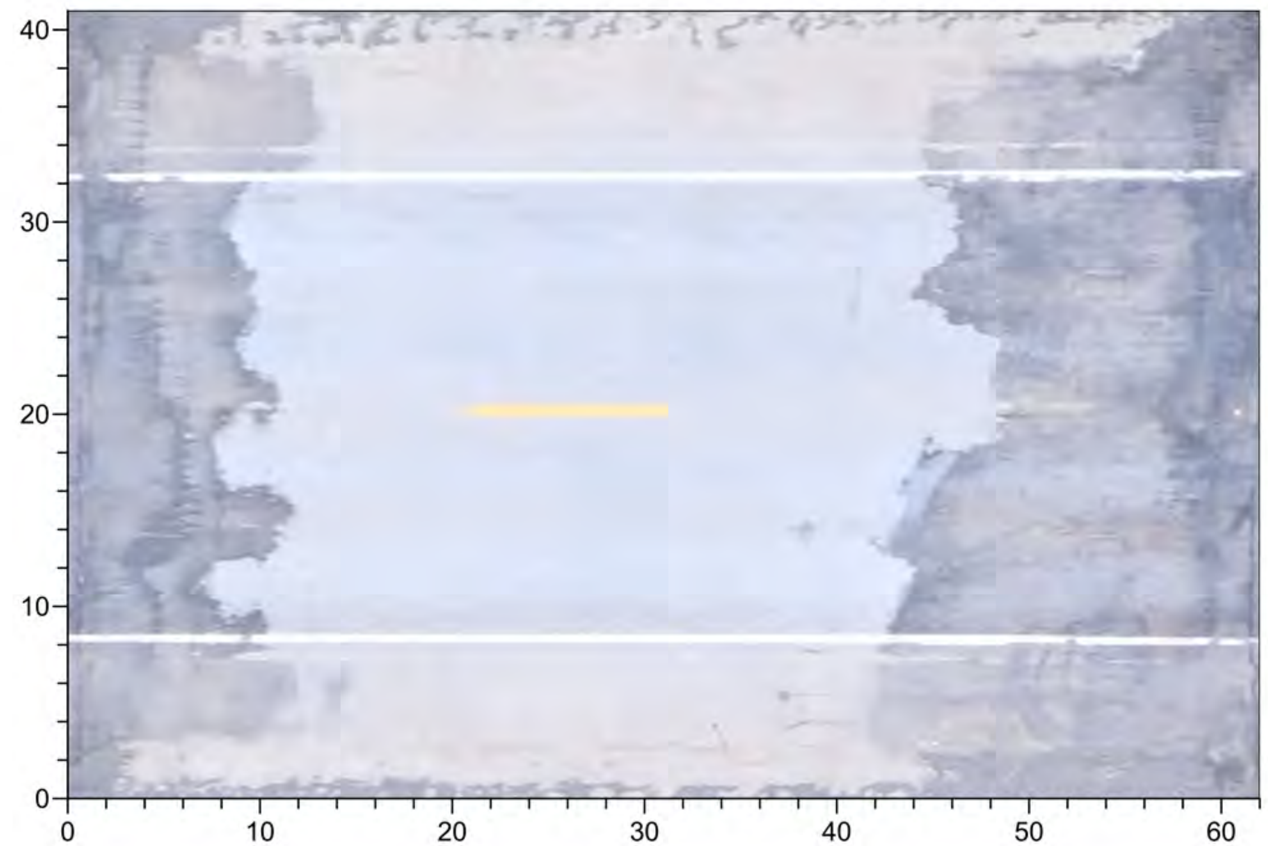
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.4	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 0695 RILEY CREEK PARKS HIGHWAY
			Delamination Quantity (ft²)	47		

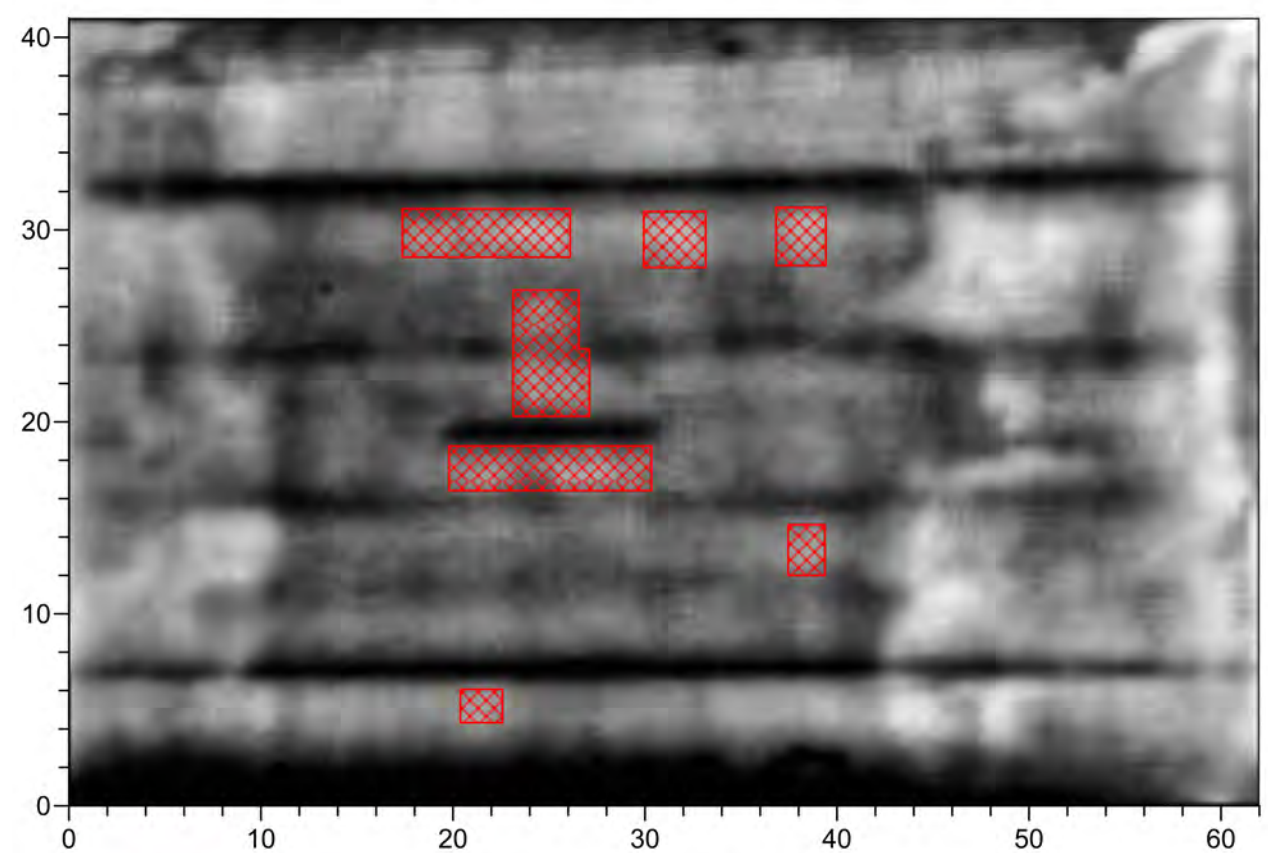




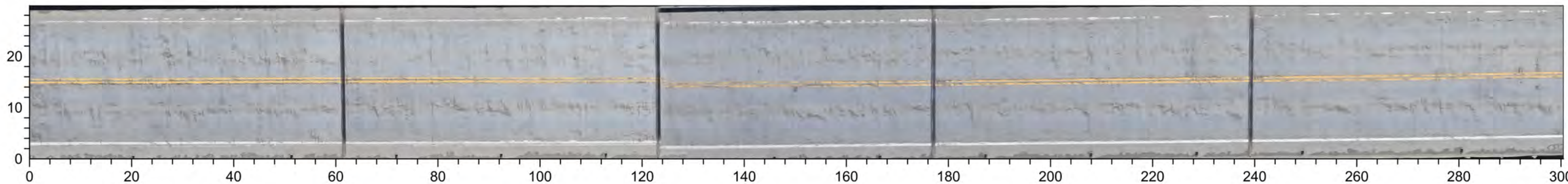
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	11.9	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/9/22	Bridge No.: 0697 KINGFISHER CREEK PARKS HIGHWAY
			Delamination Quantity (ft²)	578		

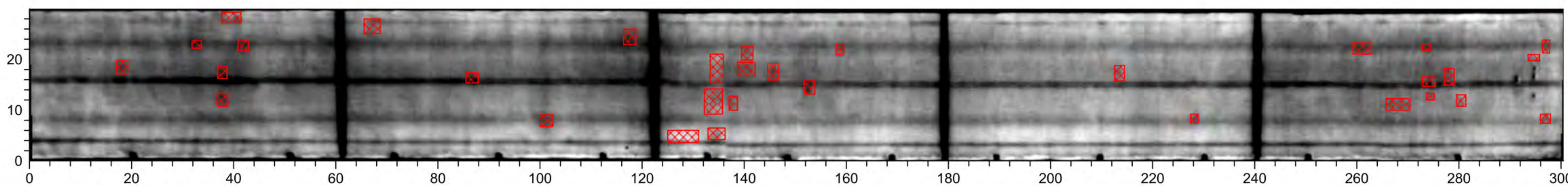
*Note: Irregular surface conditions at ends of bridge represent 1078 sq. ft.. If this area is removed from the analysis, then the results would show 6.6% of the deck area as delaminated.



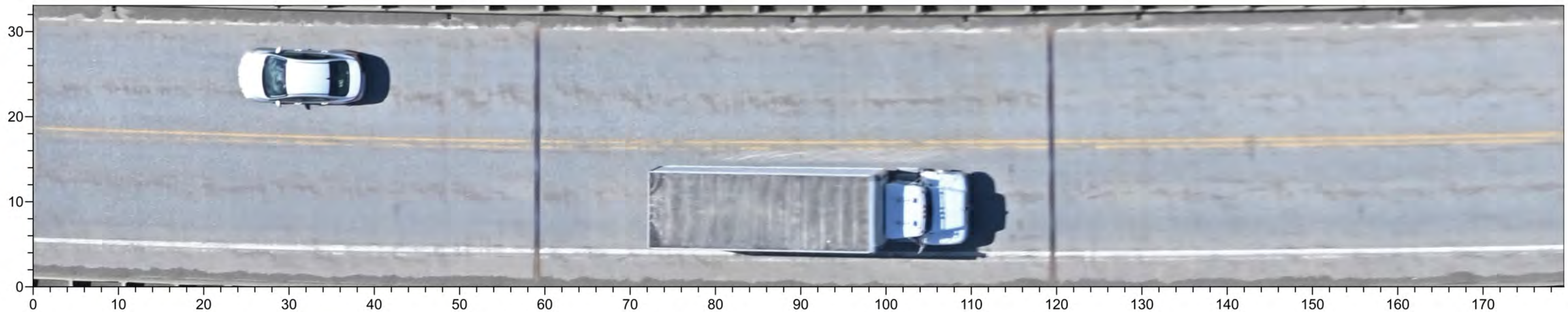


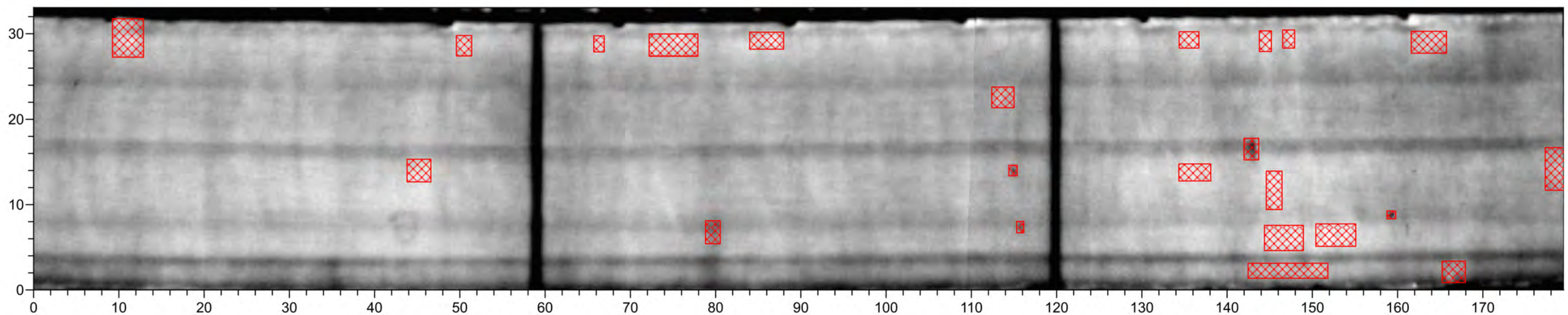
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.8	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 0722 FISH CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	97		



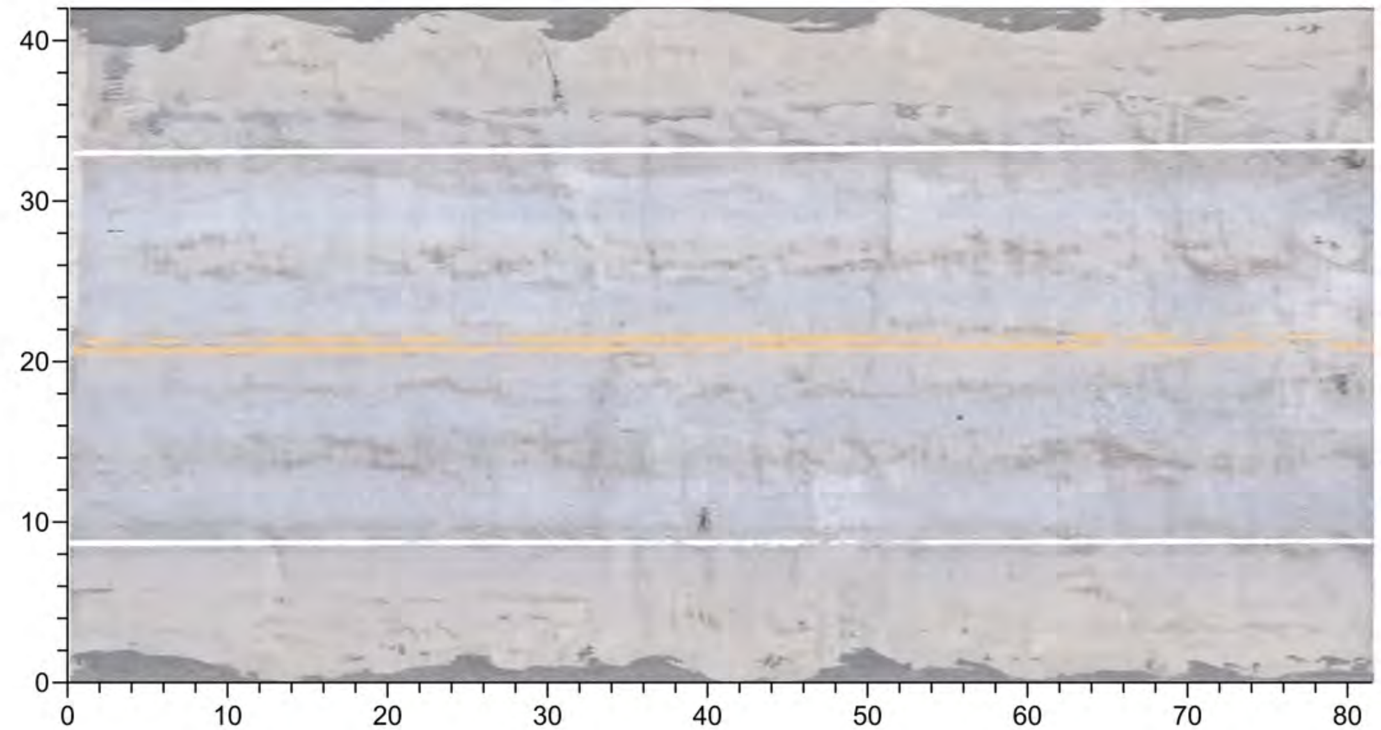


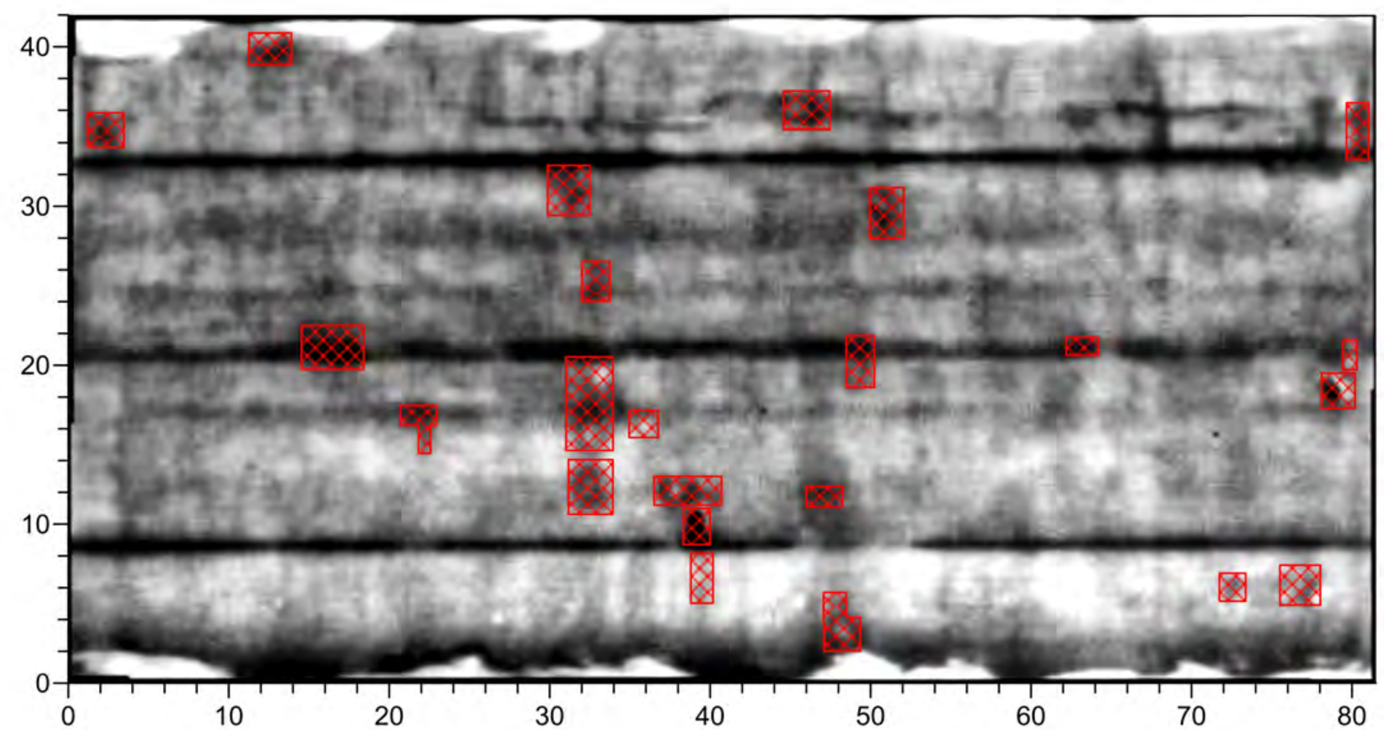
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.3	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/9/22	Bridge No.: 0851 DRY CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	207		



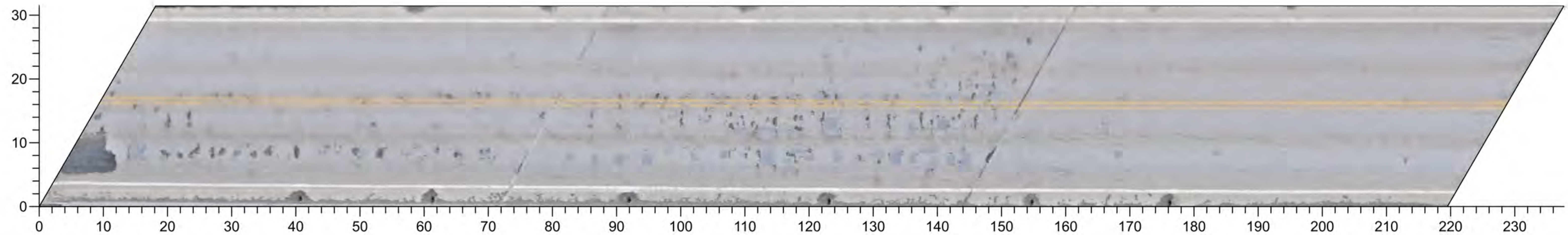


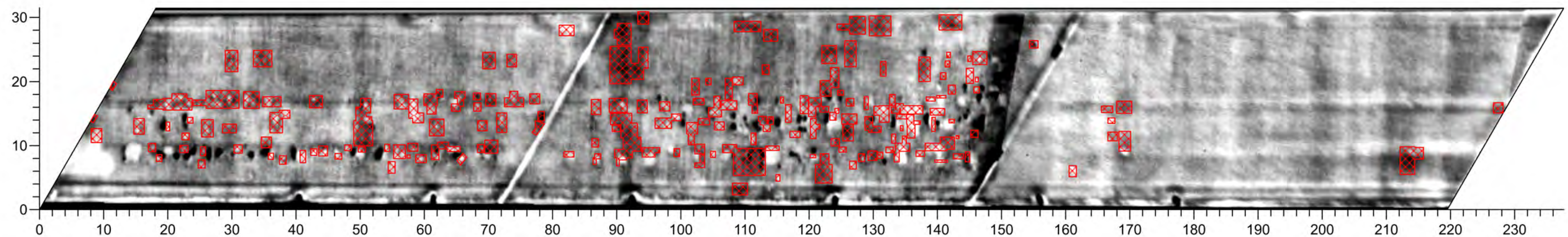
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.6	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 0852 DRY CREEK OVERFLOW PARKS HIGHWAY
			Delamination Quantity (ft^2)	157		



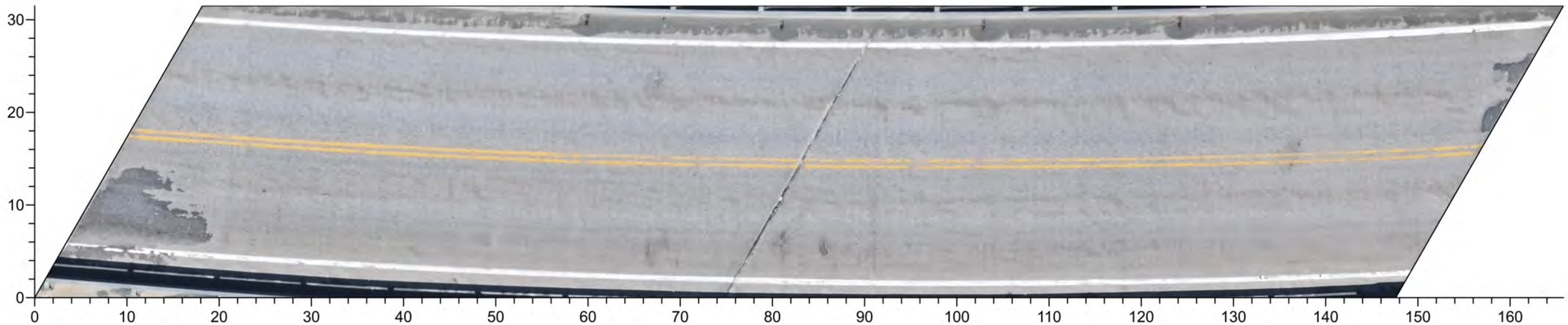


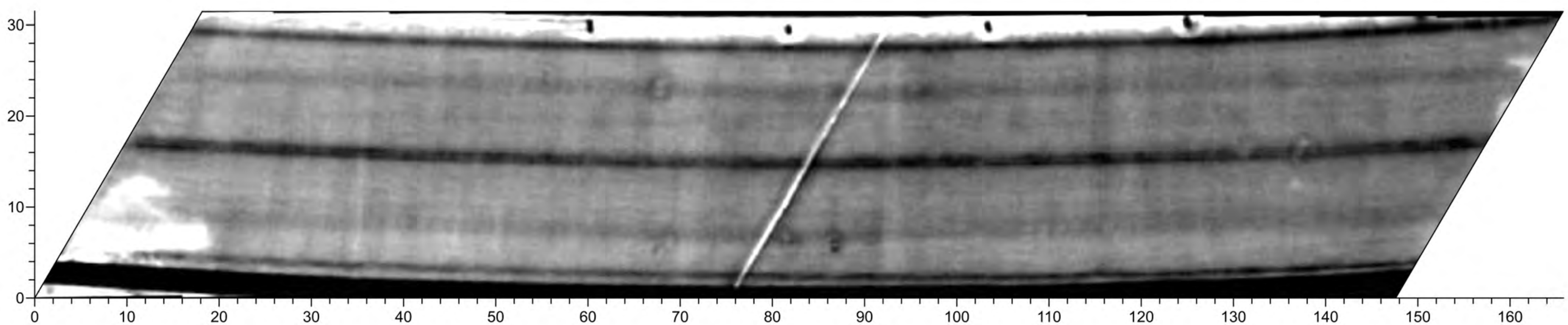
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	4.0	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/9/22	Bridge No.: 1075 DRAGONFLY CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	136		





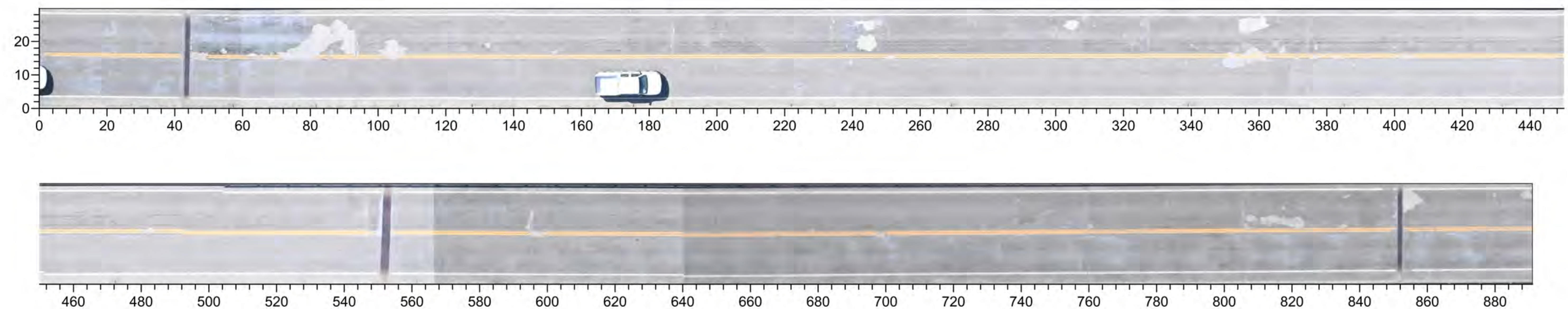
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	8.5	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1141 ANTLER CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	591		

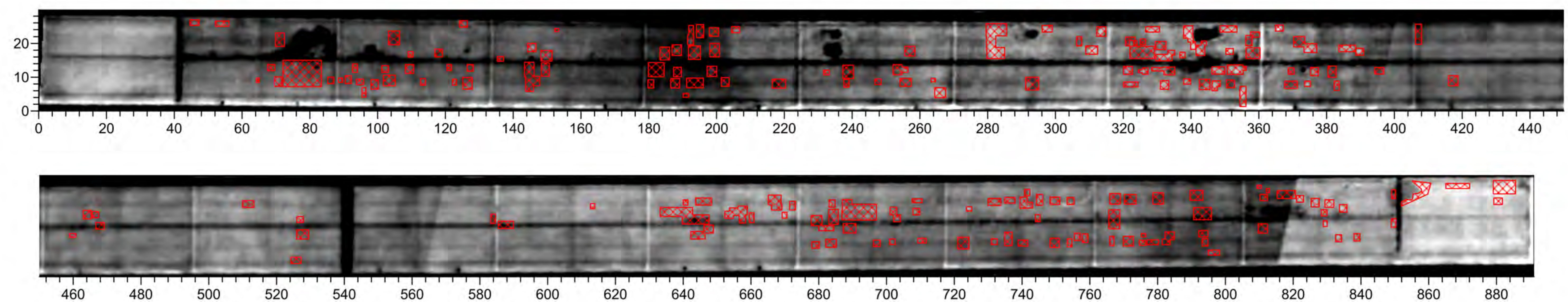




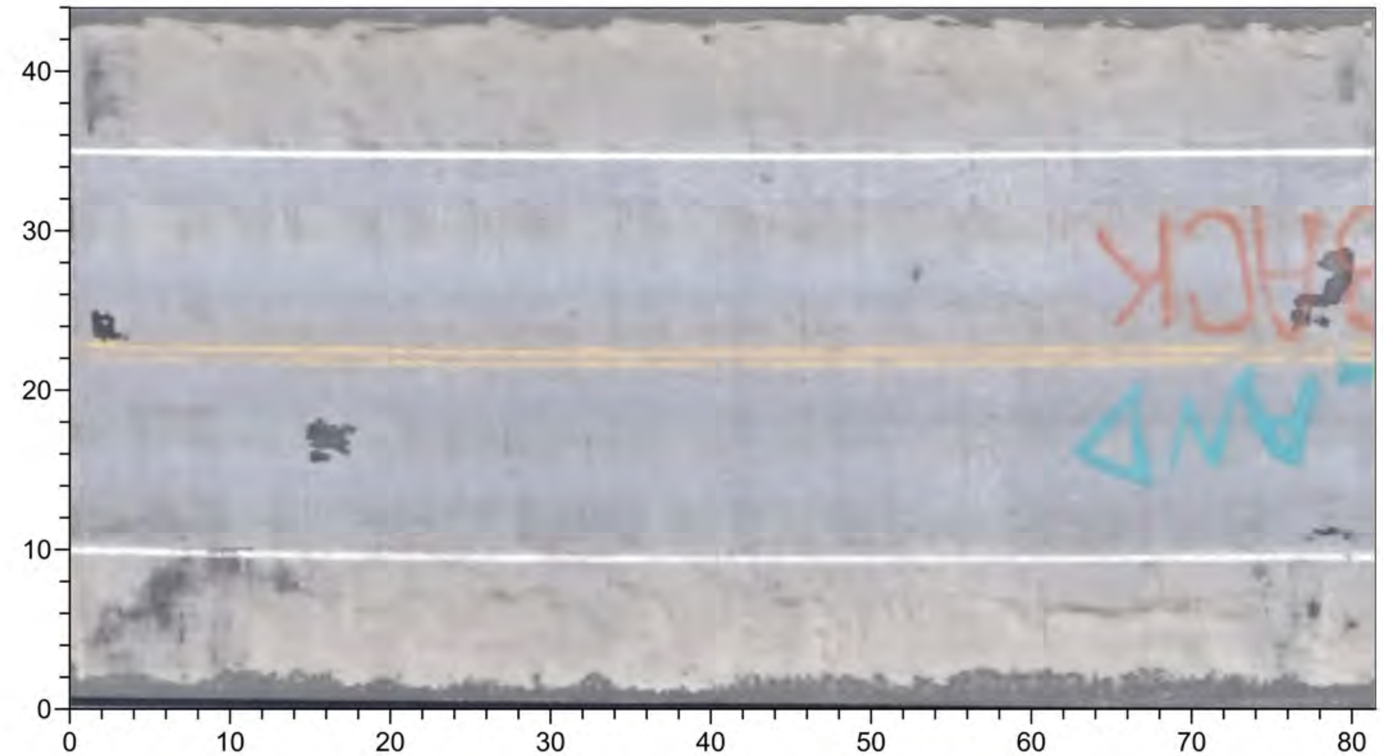
Note: Delamination locations not shown as quantity is less than 2%.

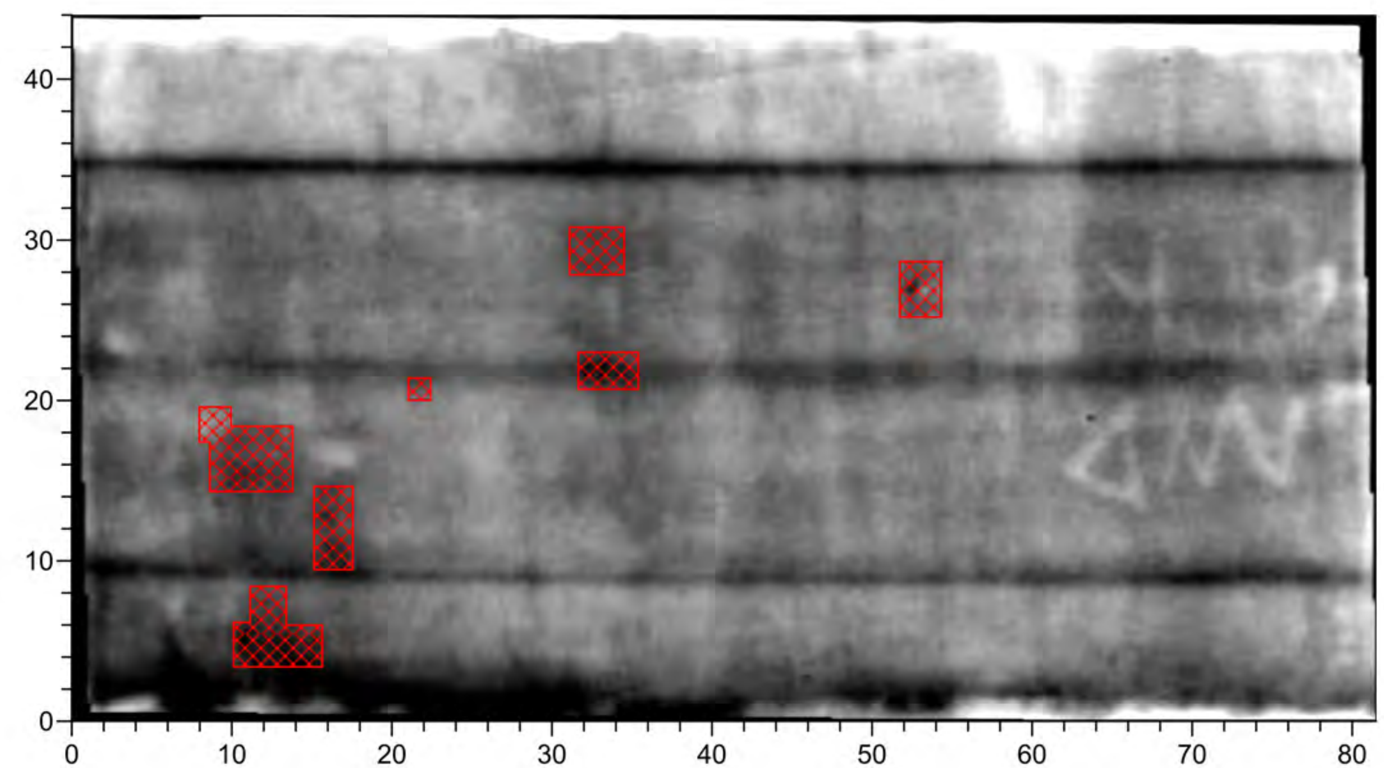
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.3	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1142 BISON GULCH PARKS HIGHWAY
			Delamination Quantity (ft^2)	63		



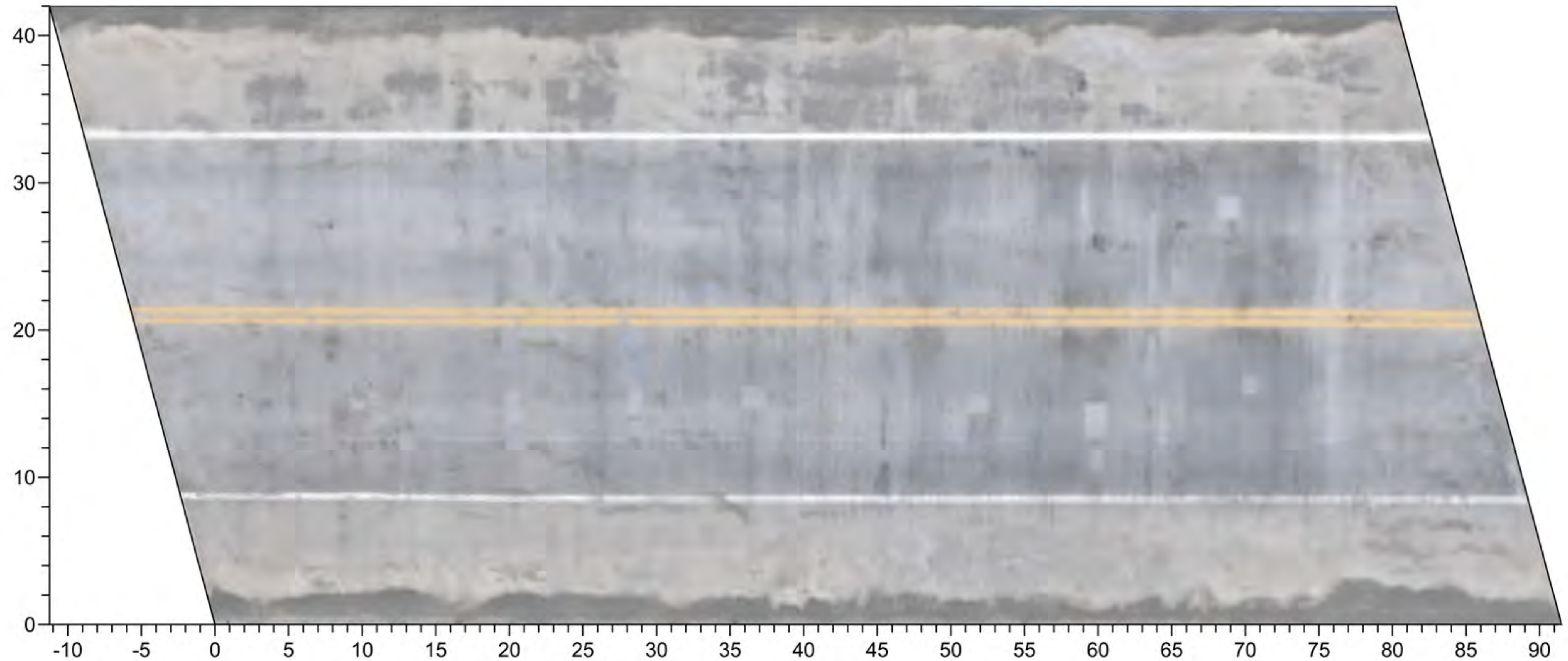


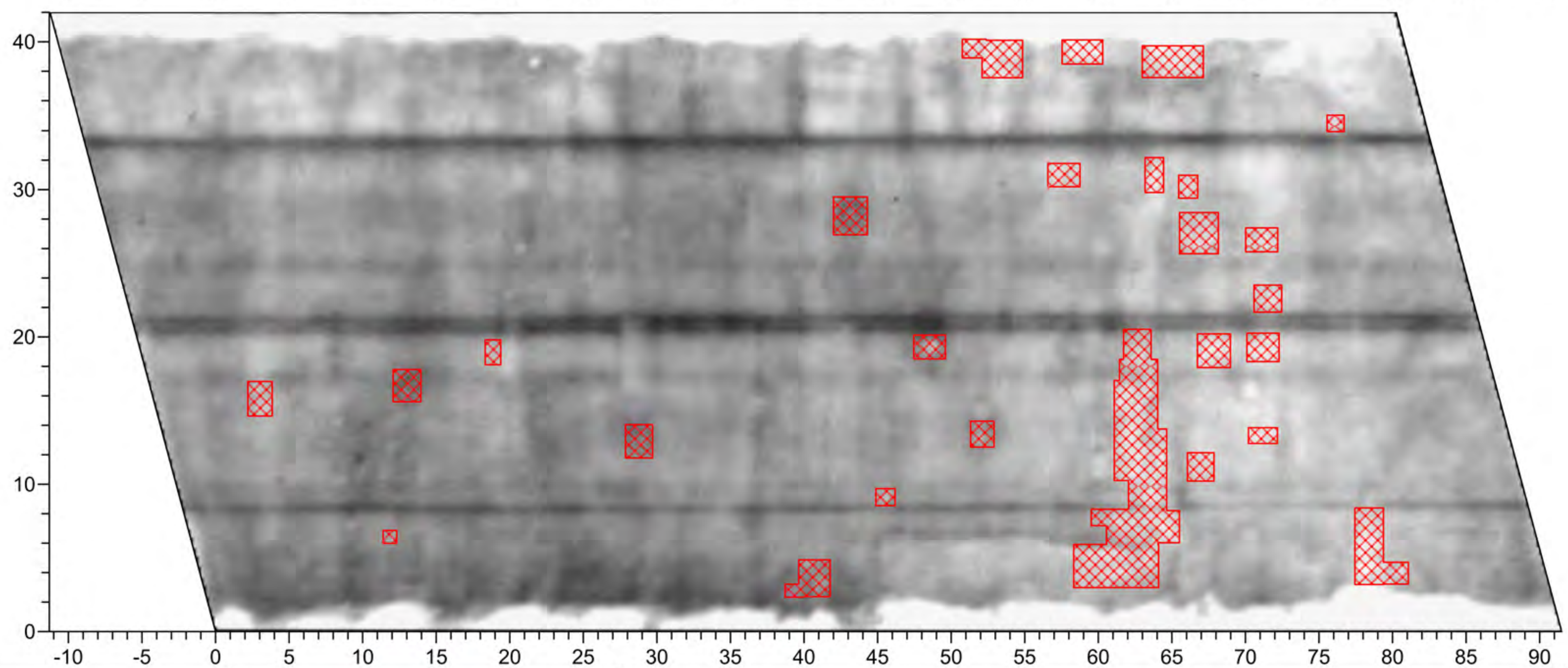
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 30-ft 0 30		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	5.8	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1143 NENANA RIVER AT MOODY PARKS HIGHWAY
			Delamination Quantity (ft^2)	1546		



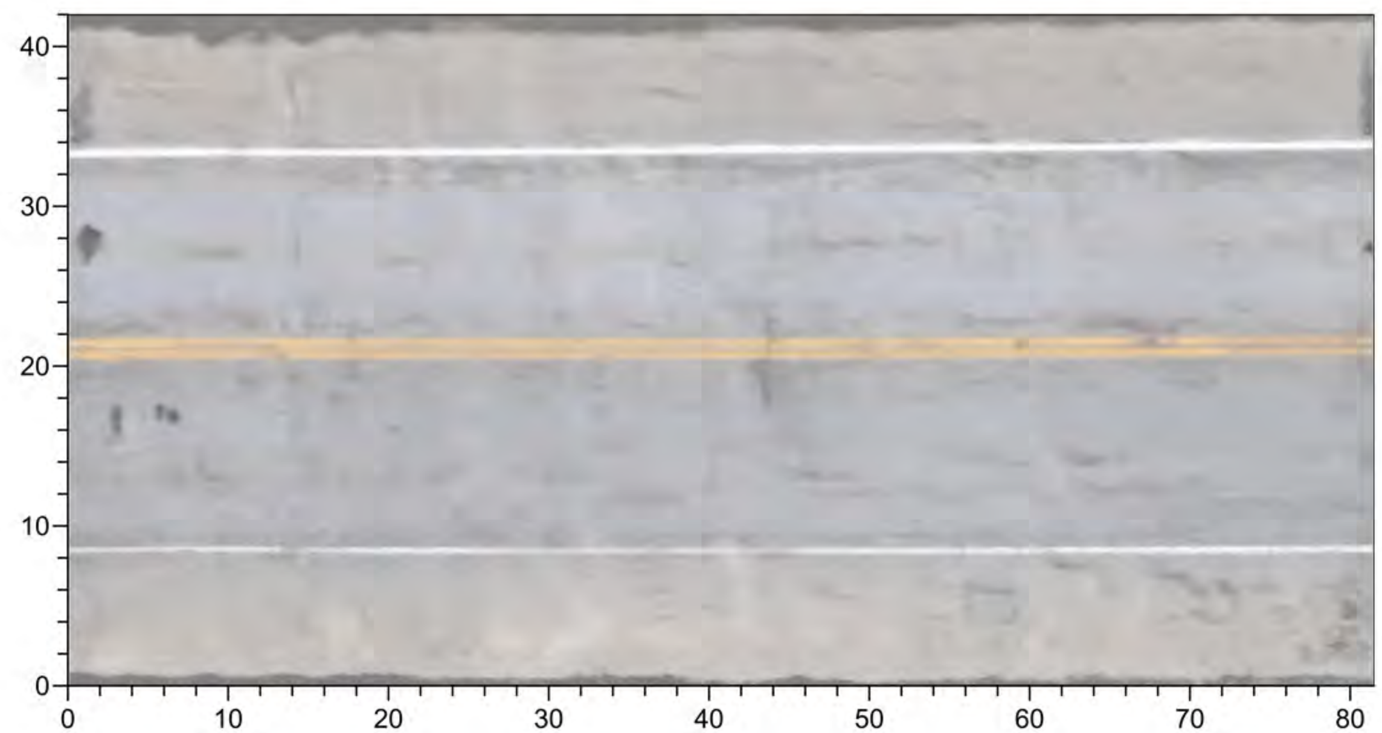


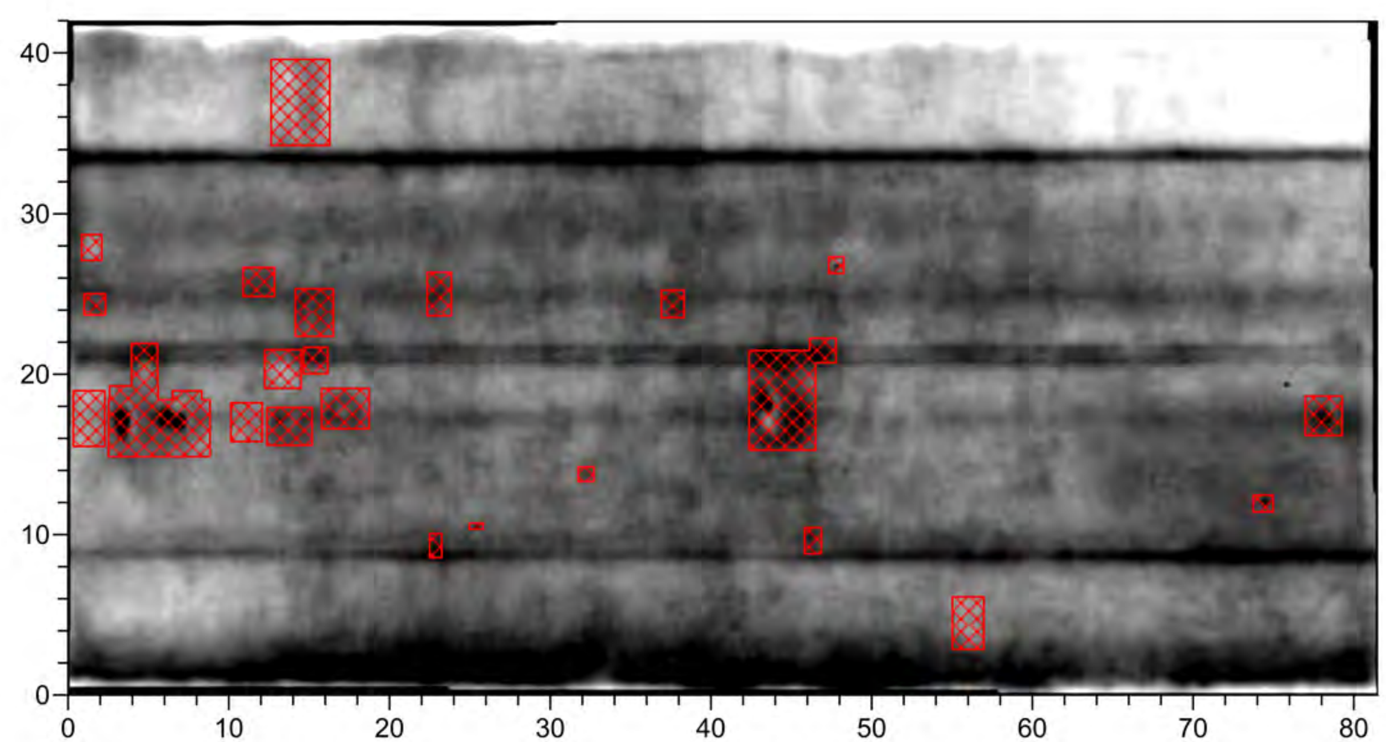
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.4	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1144 FOX CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	87		



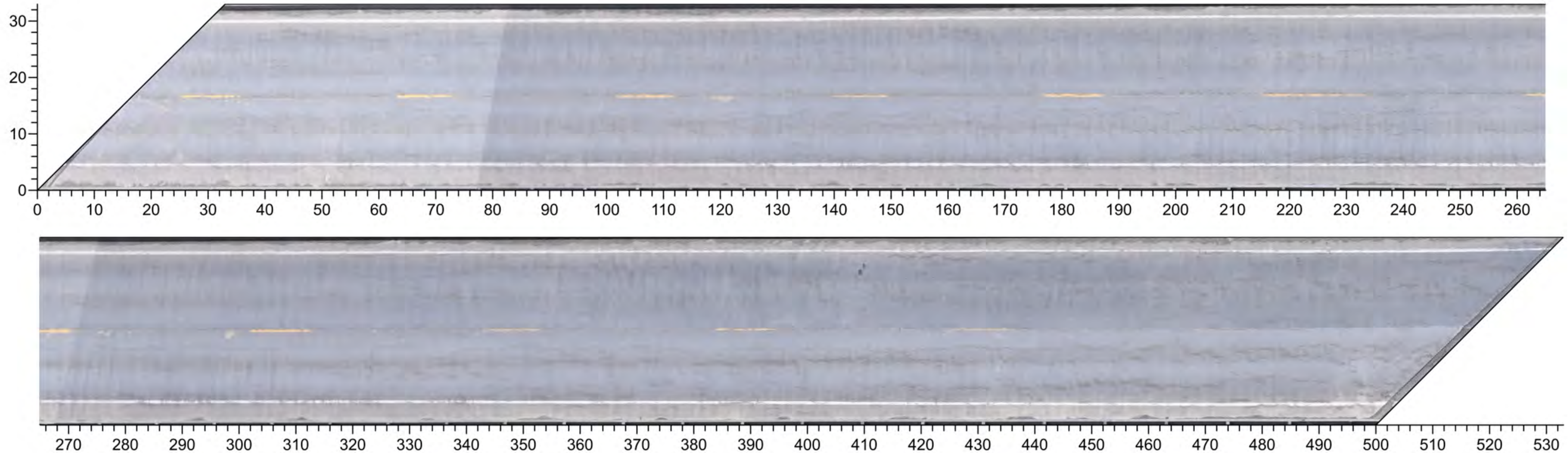


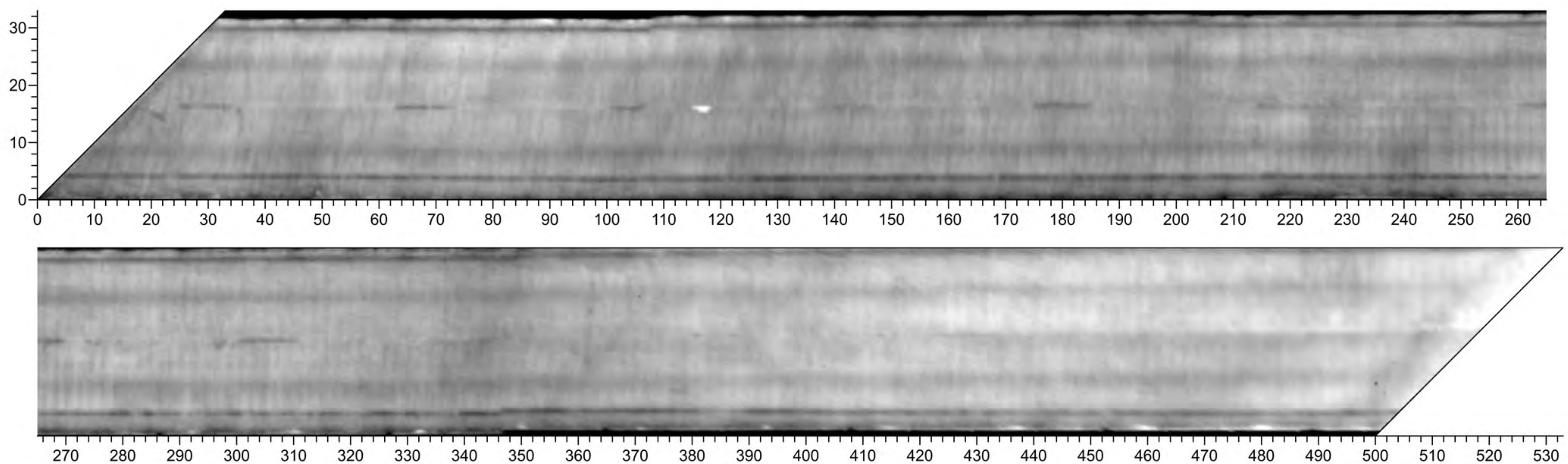
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	4.5	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1145 HORNET CREEK PARKS HIGHWAY
			Delamination Quantity (ft^2)	173		





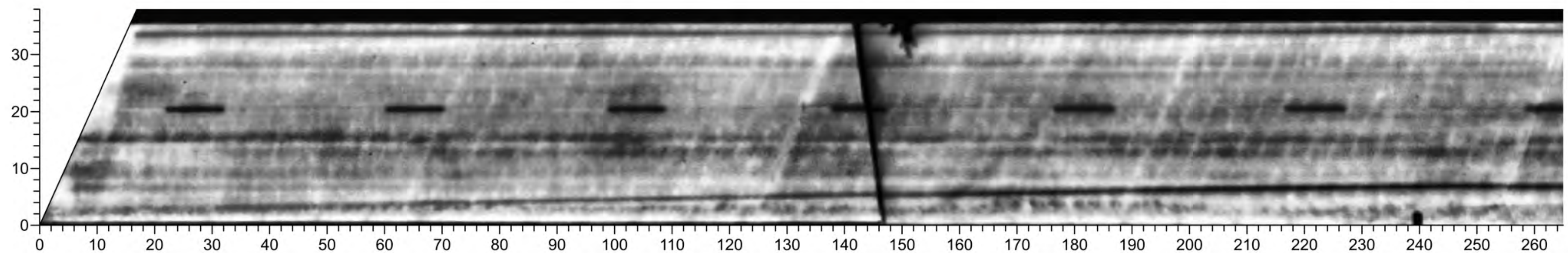
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	4.4	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1146 ICEWORM GULCH PARKS HIGHWAY
			Delamination Quantity (ft^2)	151		



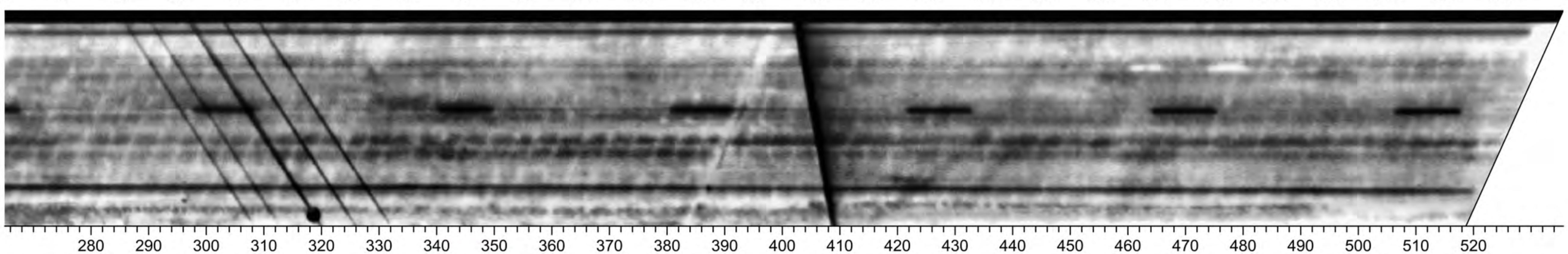


Note: Delamination locations not shown as quantity is less than 2%.

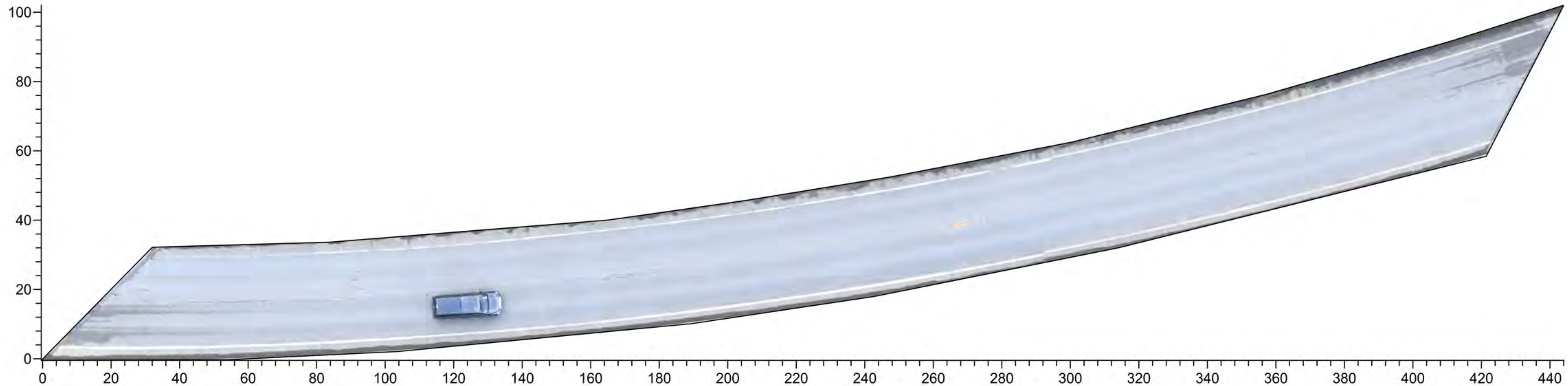
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.9	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1147 NENANA RIVER PARK STA PARKS HIGHWAY
			Delamination Quantity (ft^2)	155		

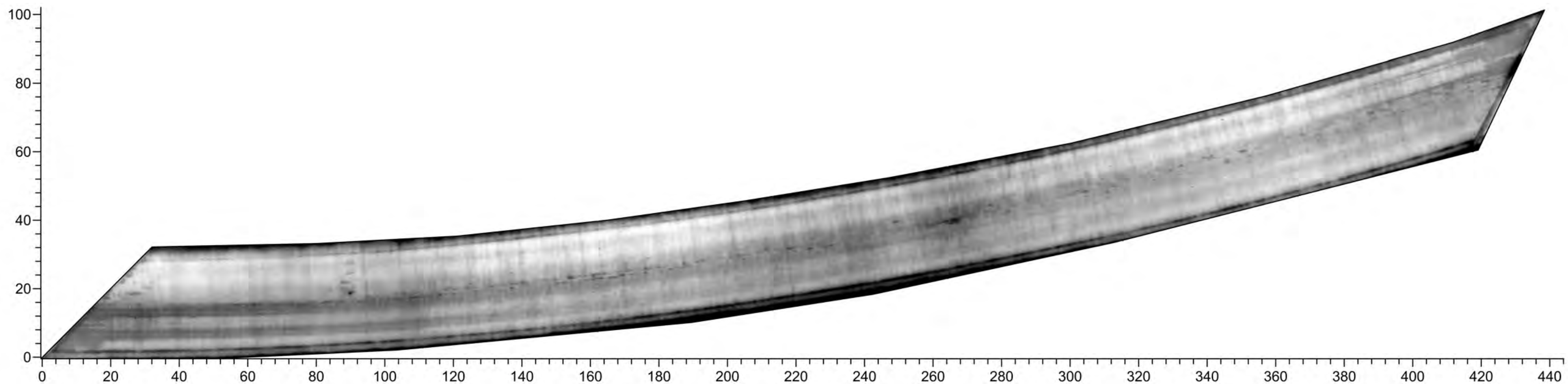


Note: Delamination locations not shown as quantity is less than 2%.



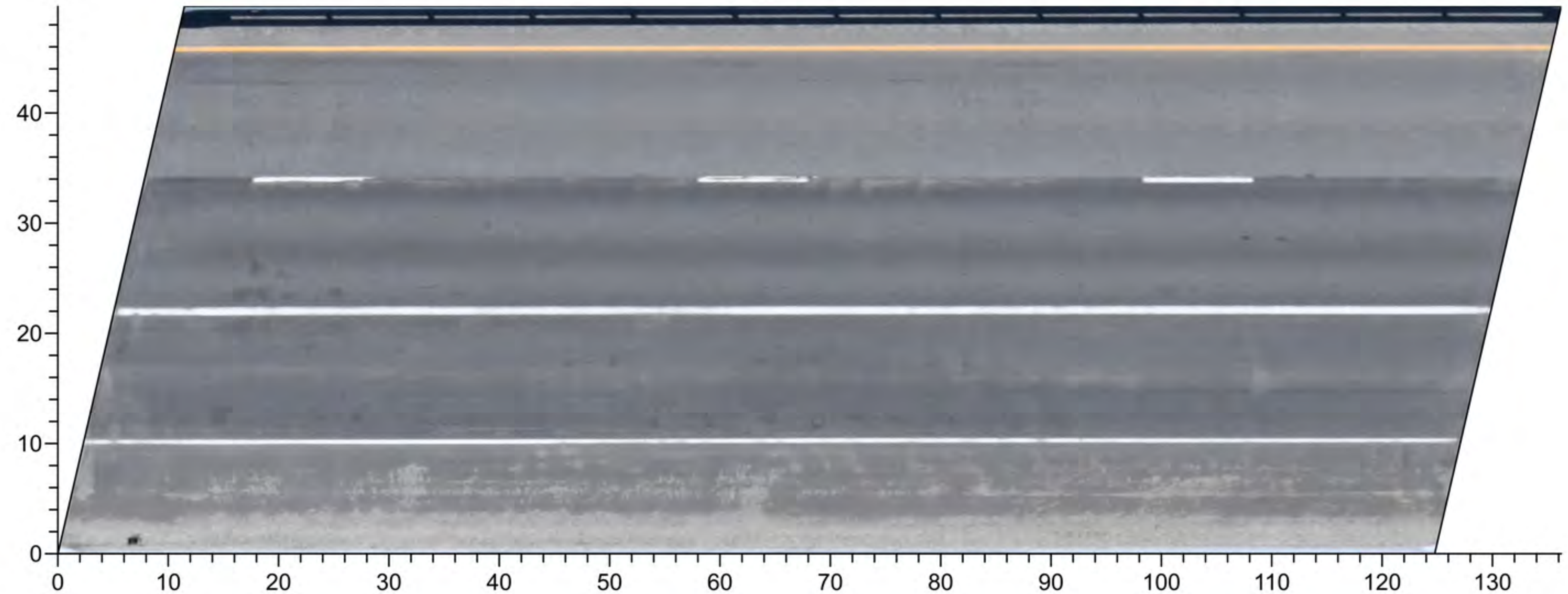
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.3	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1161 CHENA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	251		

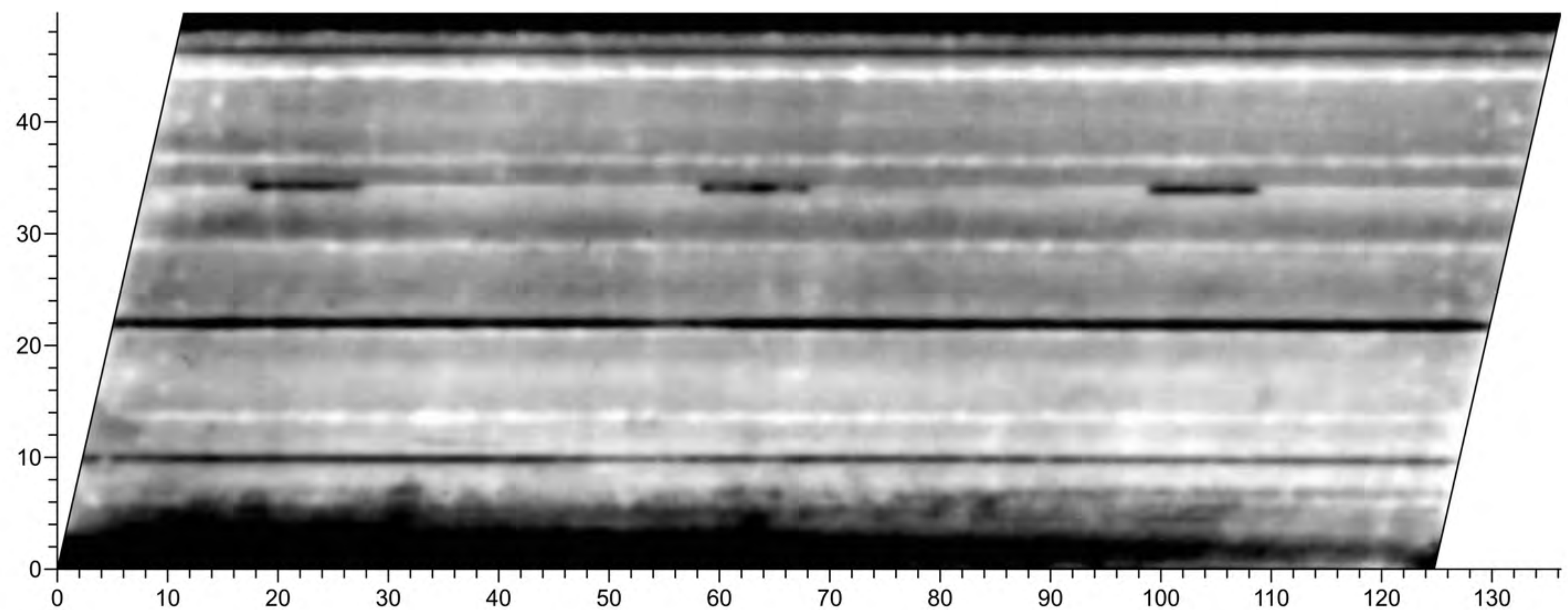




Note: Delamination locations not shown as quantity is less than 2%.

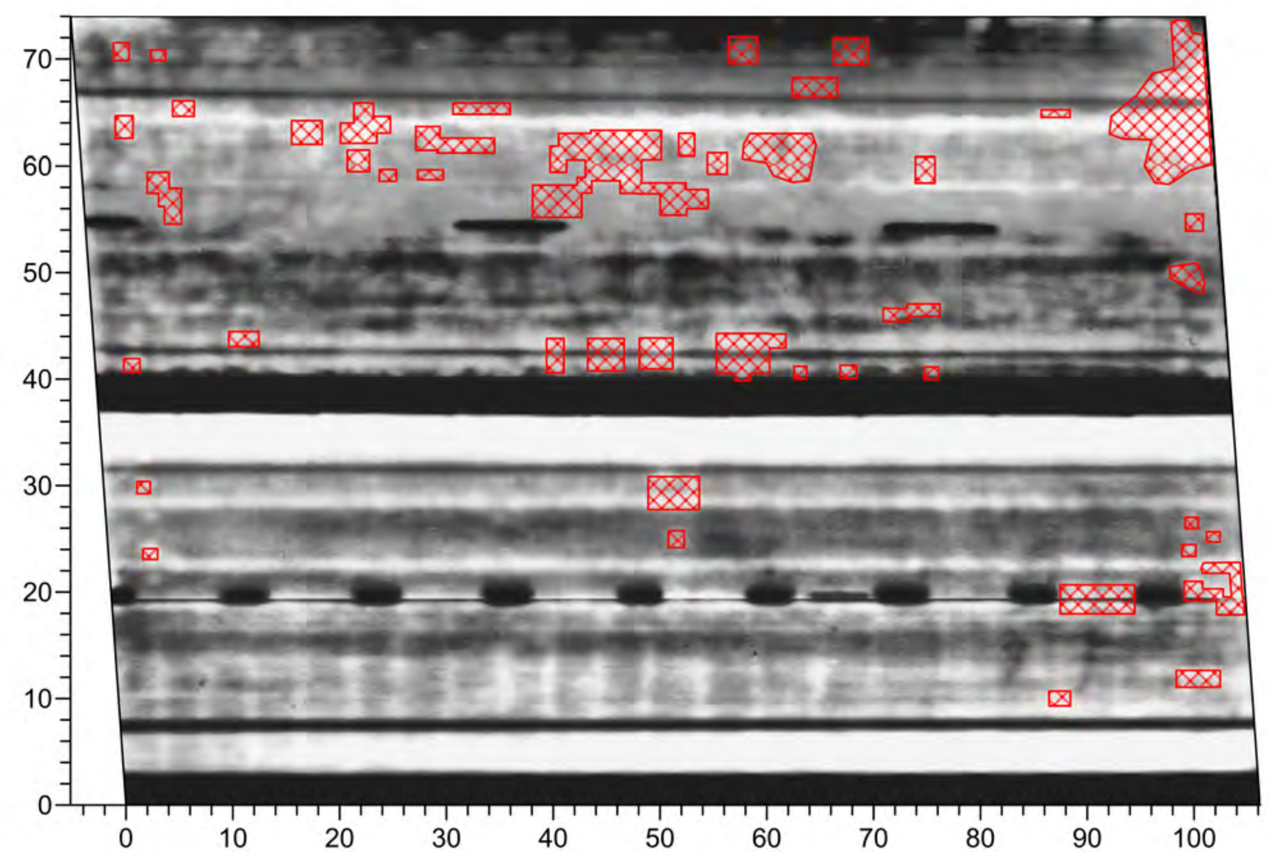
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 30-ft 0 30		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.2	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1243 NENANA RIVER AT WINDY PARKS HIGHWAY
			Delamination Quantity (ft^2)	29		



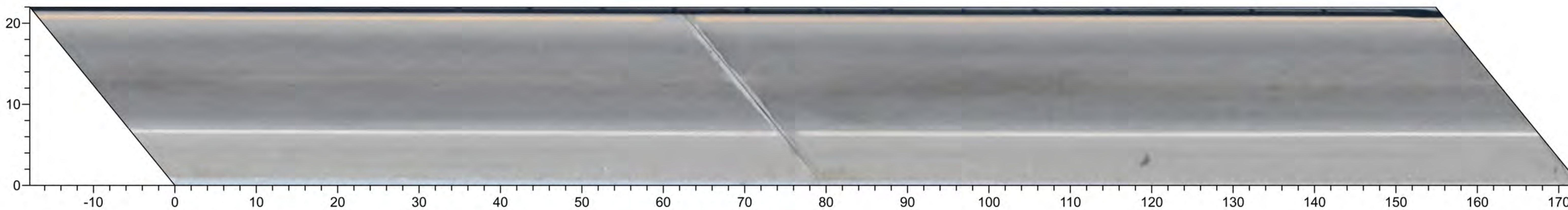


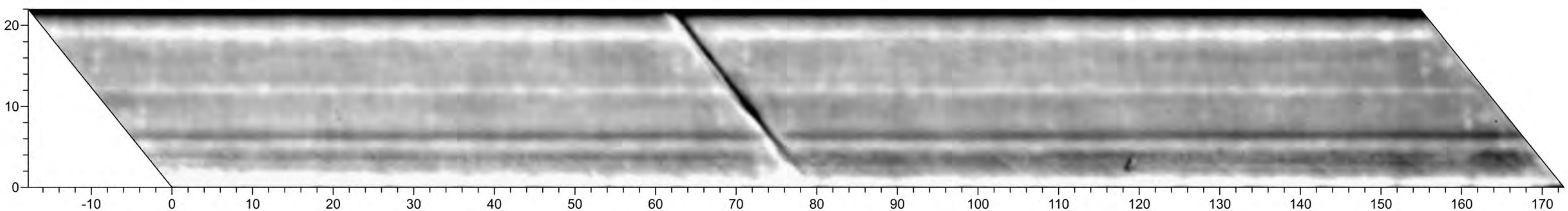
Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.5	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1244 AIRPORT WAY UC SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	95		



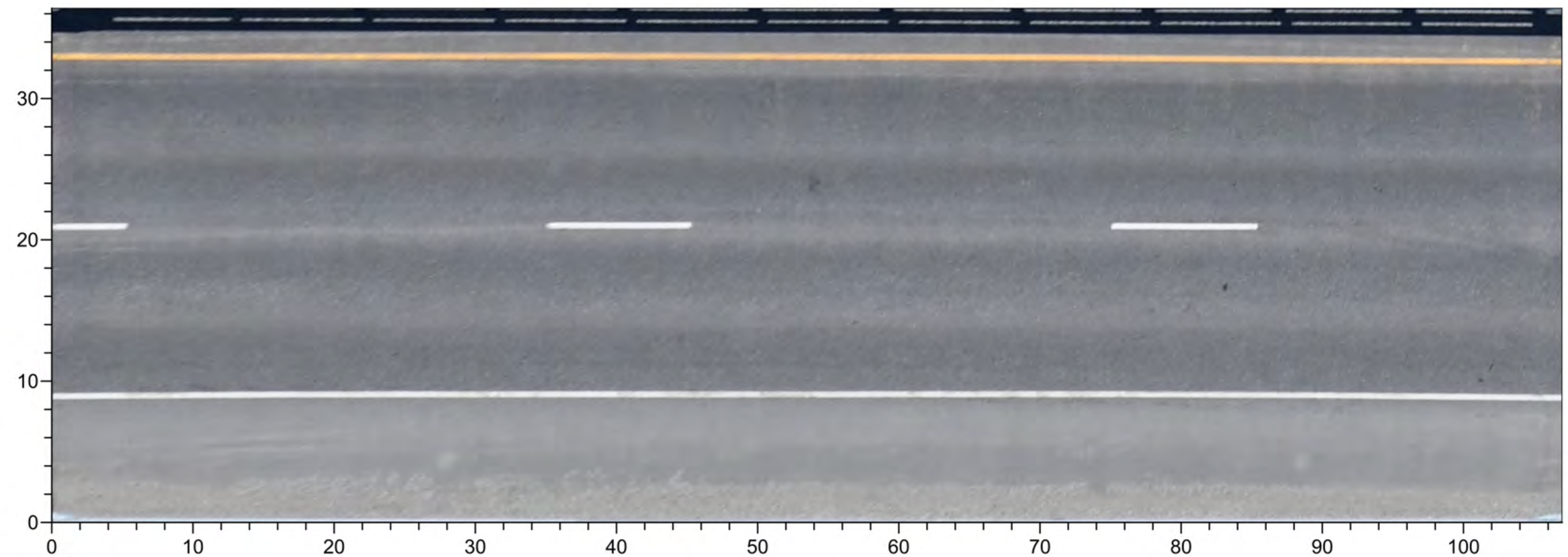
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 18-ft 0 18	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	5.3	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1705 CUSHMAN ST UC PARKS HIGHWAY
			Delamination Quantity (ft^2)	414		

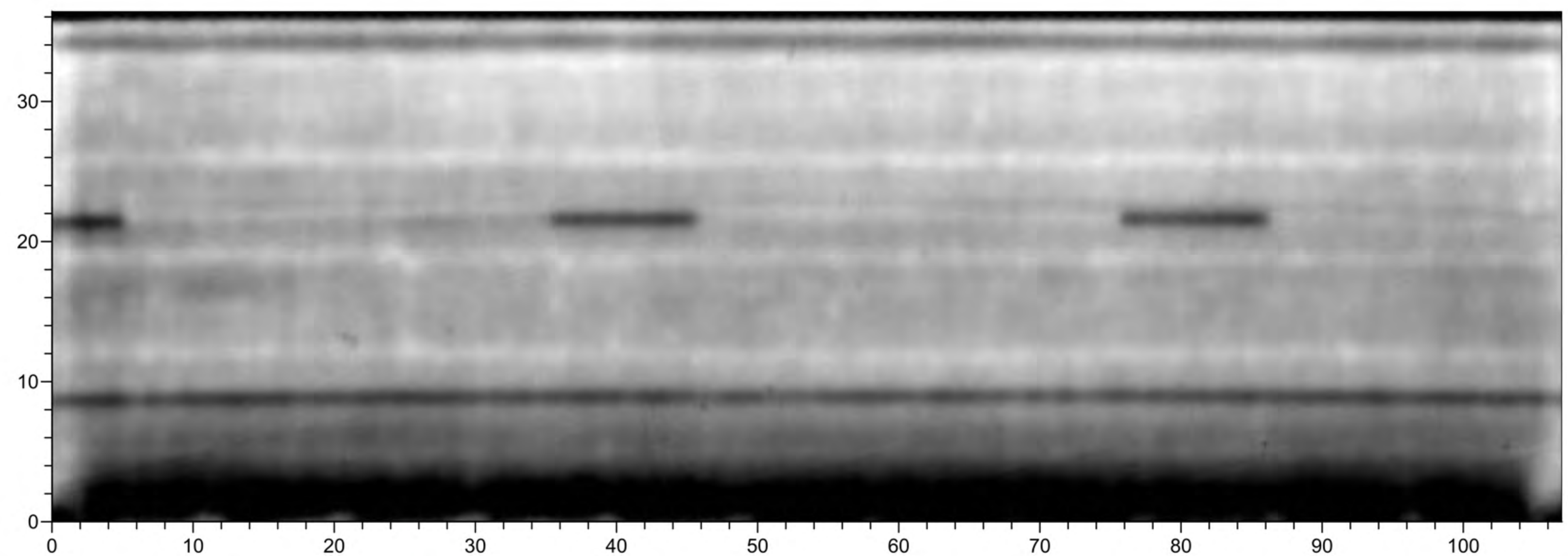




Note: Delamination locations not shown as quantity is less than 2%.

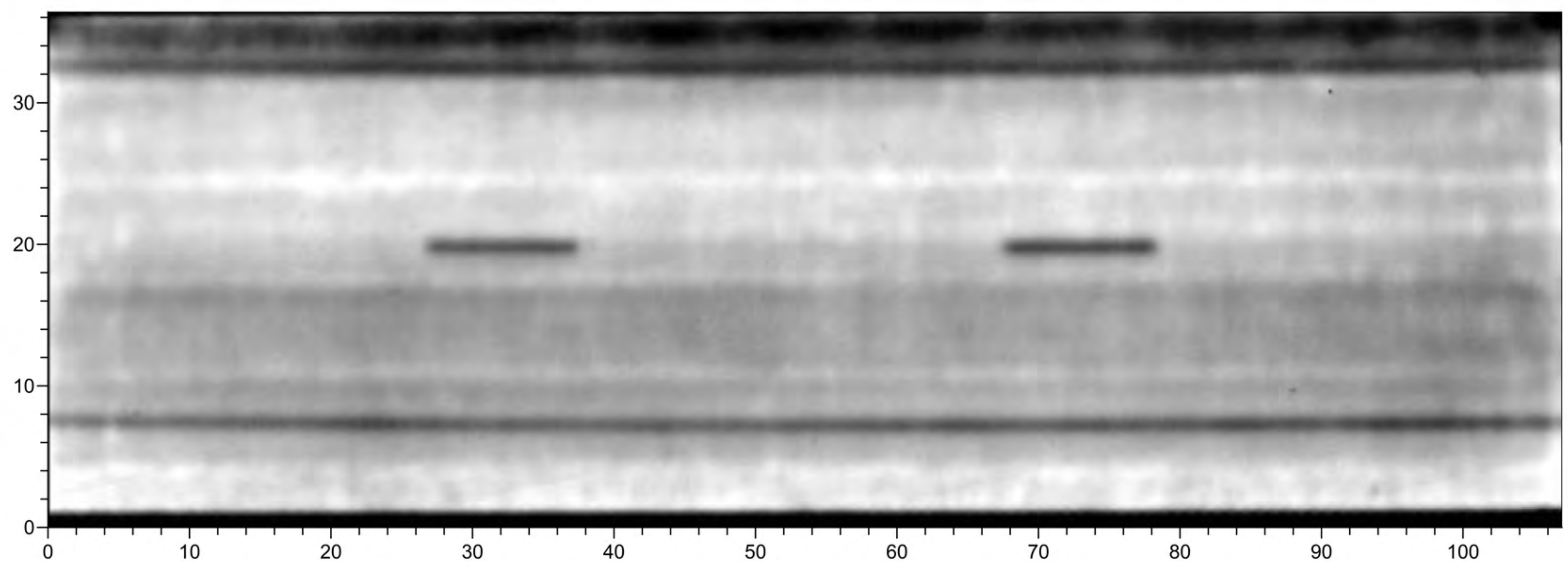
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.5	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1707 W-W RAMP OC PARKS HIGHWAY
			Delamination Quantity (ft^2)	56		





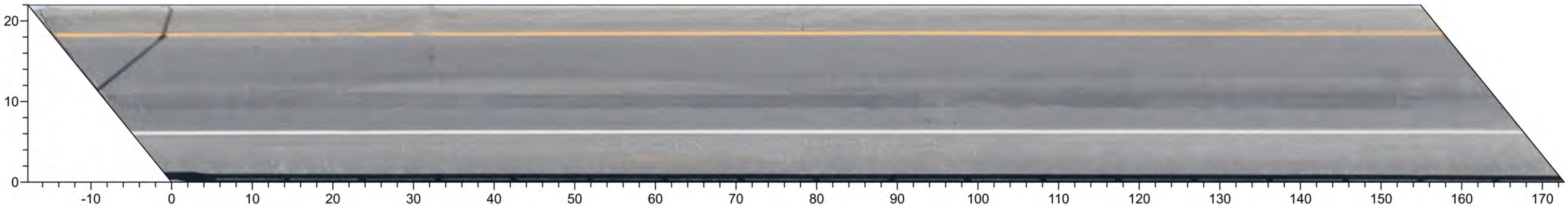
Note: Delamination locations not shown as quantity is less than 2%.

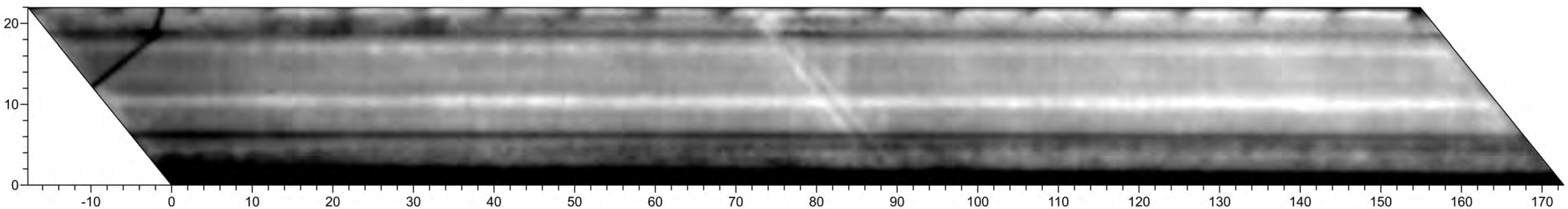
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.9	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1878 PARKS/CHENA RIDGE SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	36		



Note: Delamination locations not shown as quantity is less than 2%.

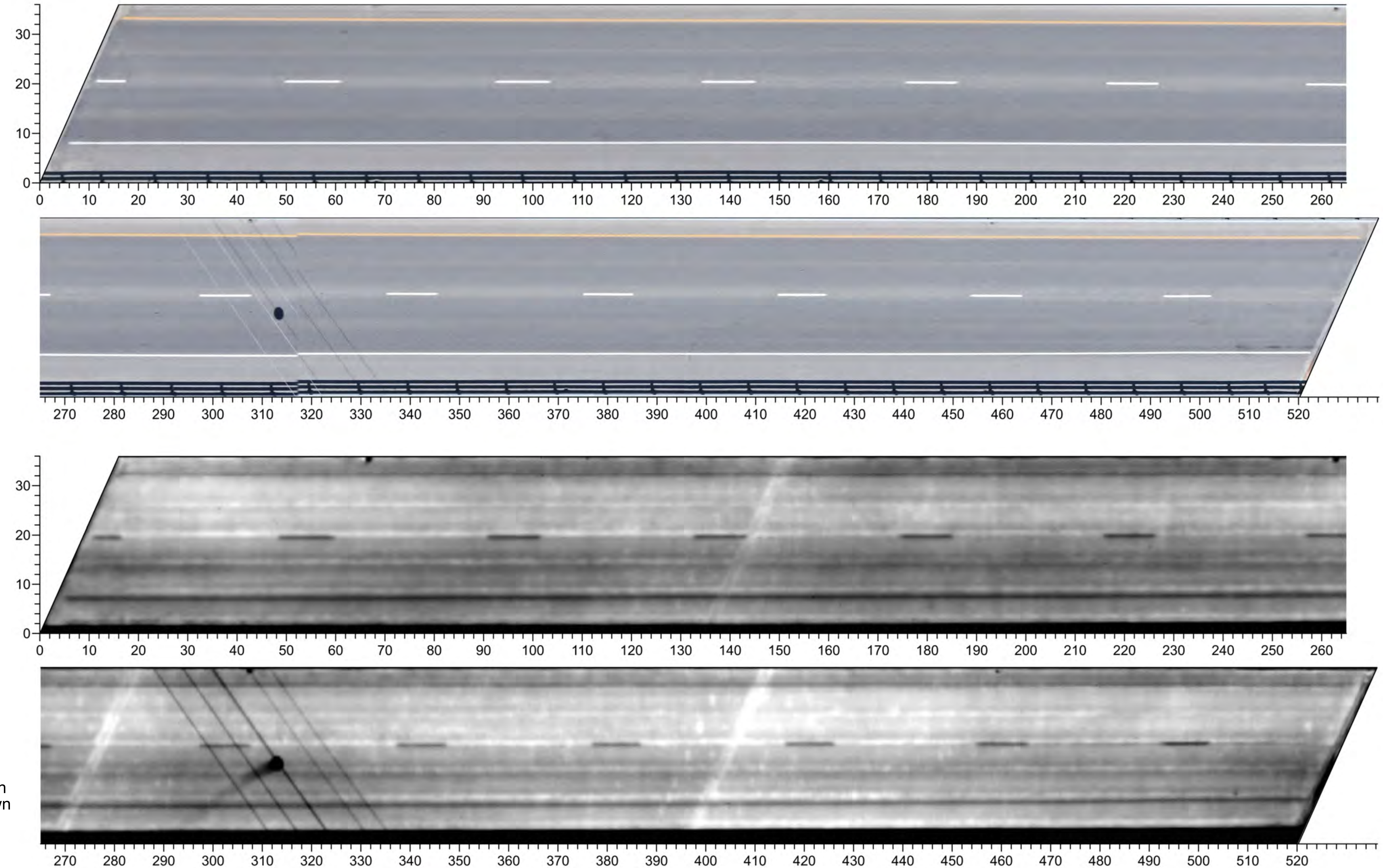
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.7	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1879 PARKS/CHENA RIDGE NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	28		





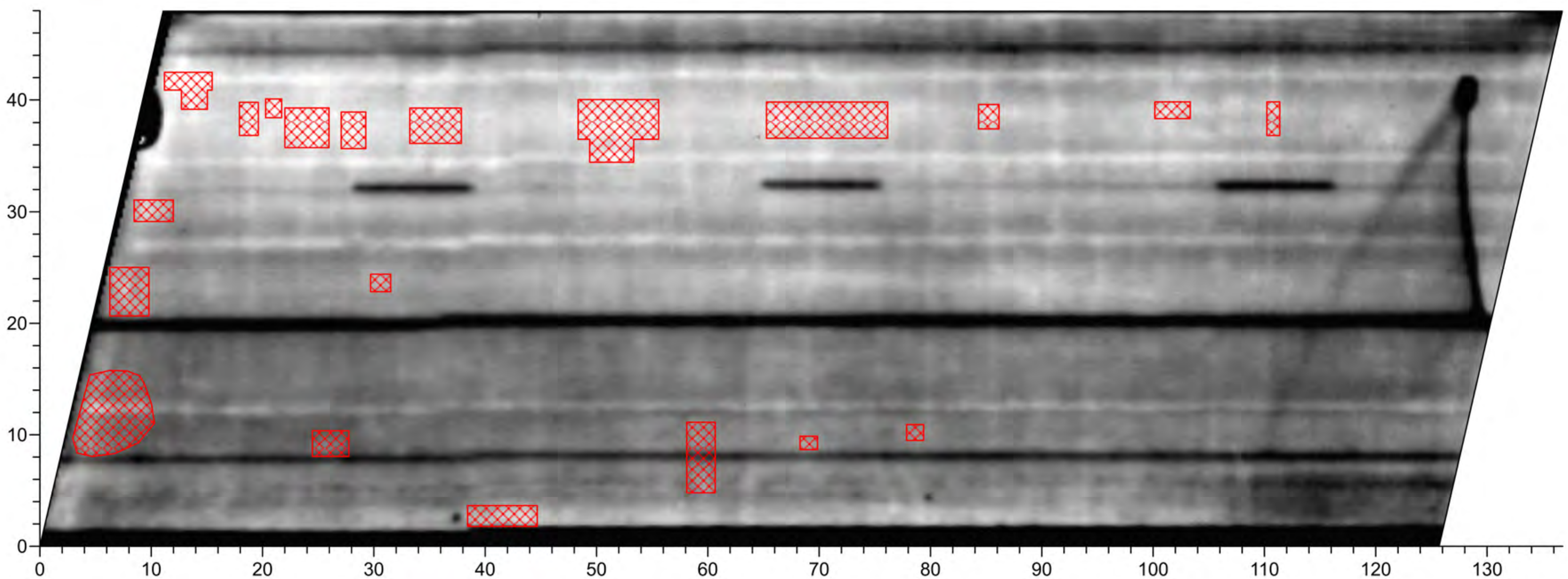
Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		 Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.6	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1912 E-N LOOP RAMP PARKS HIGHWAY
			Delamination Quantity (ft^2)	22		

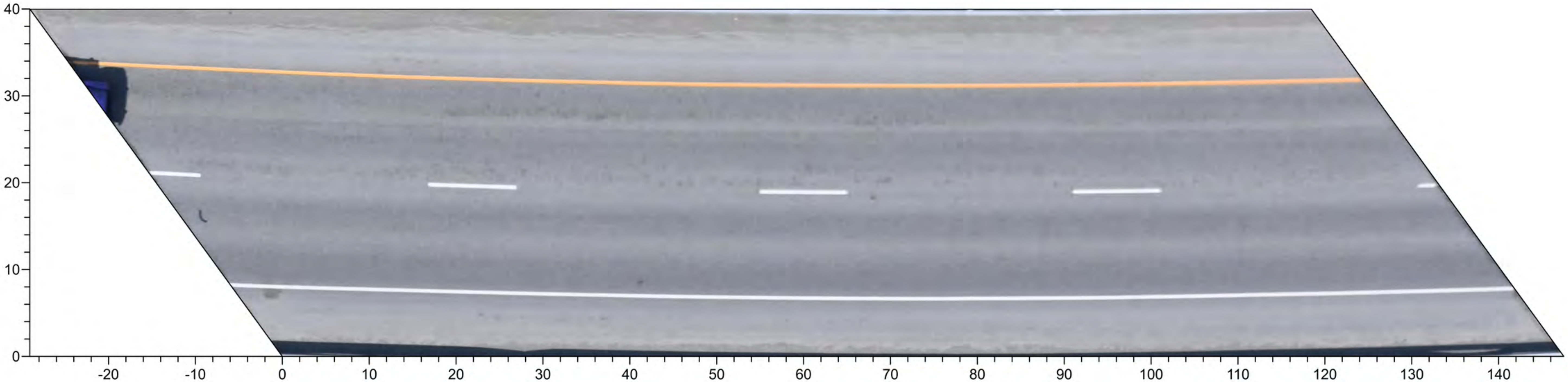


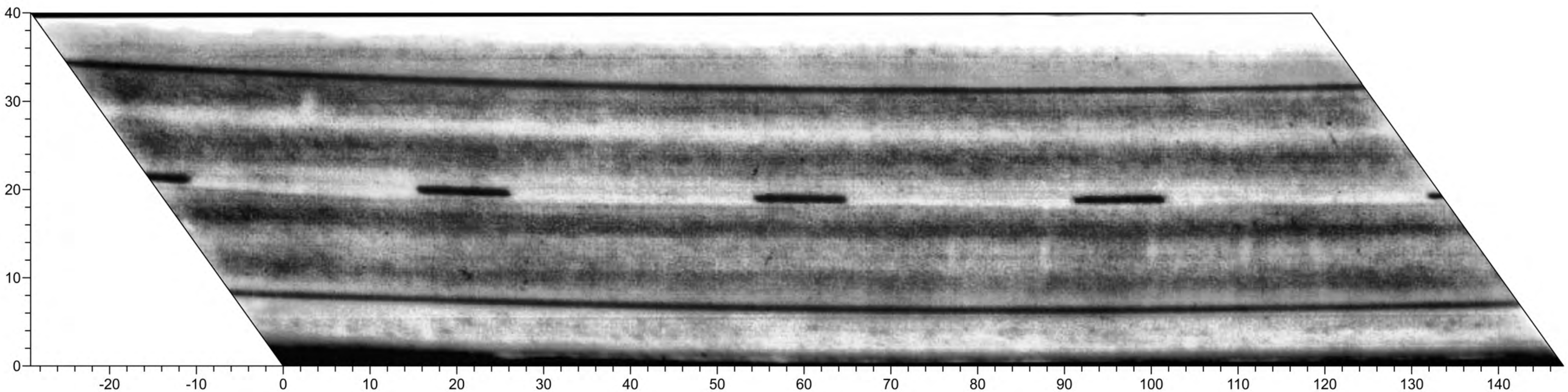
Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.2	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1913 CHENA RIVER PARKS HIGHWAY
			Delamination Quantity (ft^2)	216		



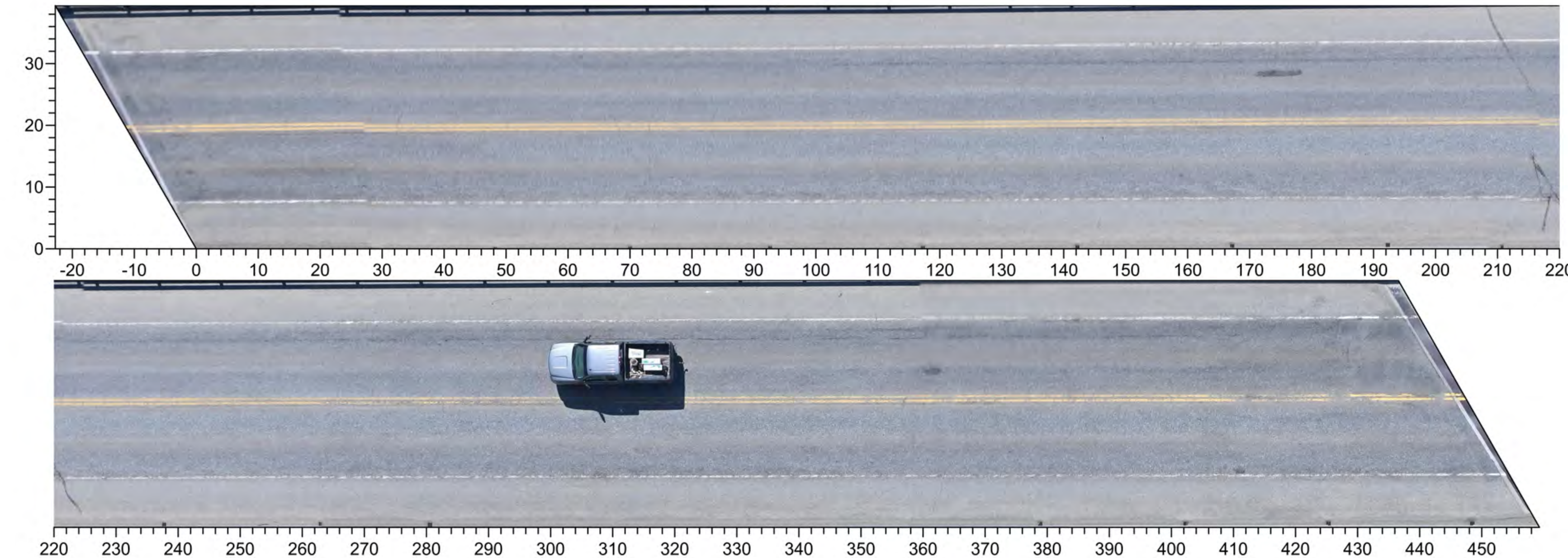
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	4.0	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1914 AIRPORT WAY UC NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	242		

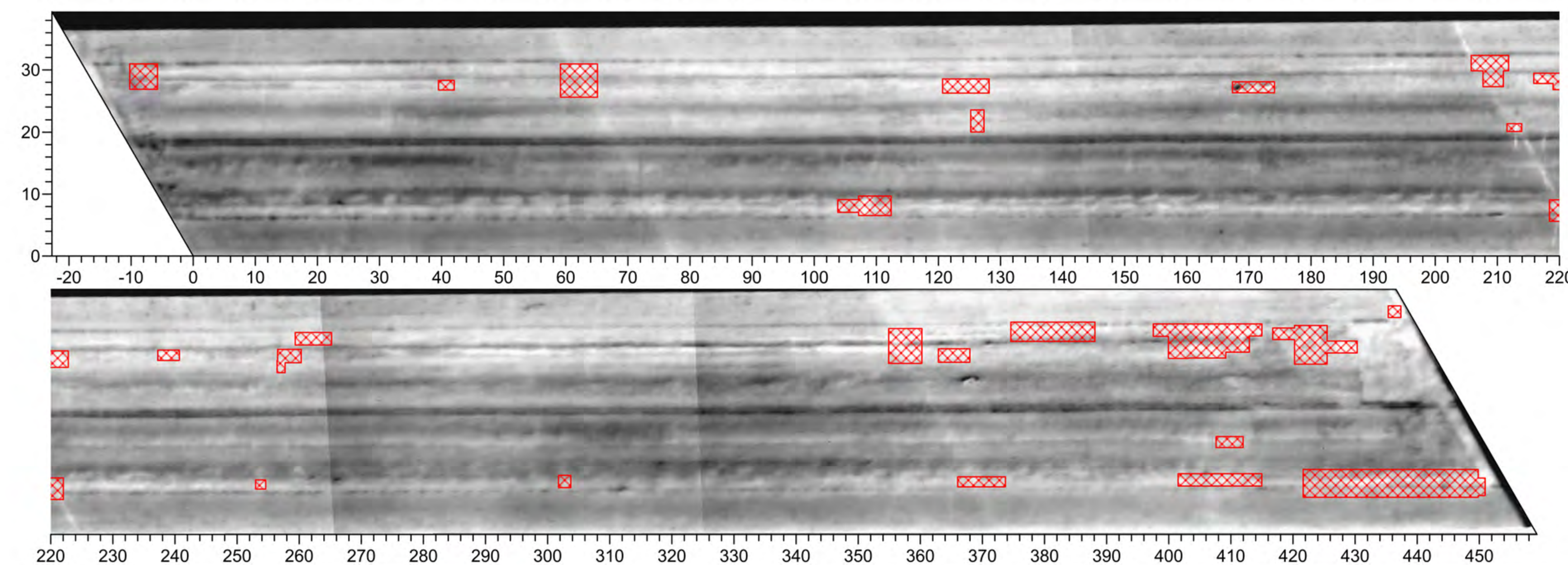




Note: Delamination locations not shown as quantity is less than 2%.

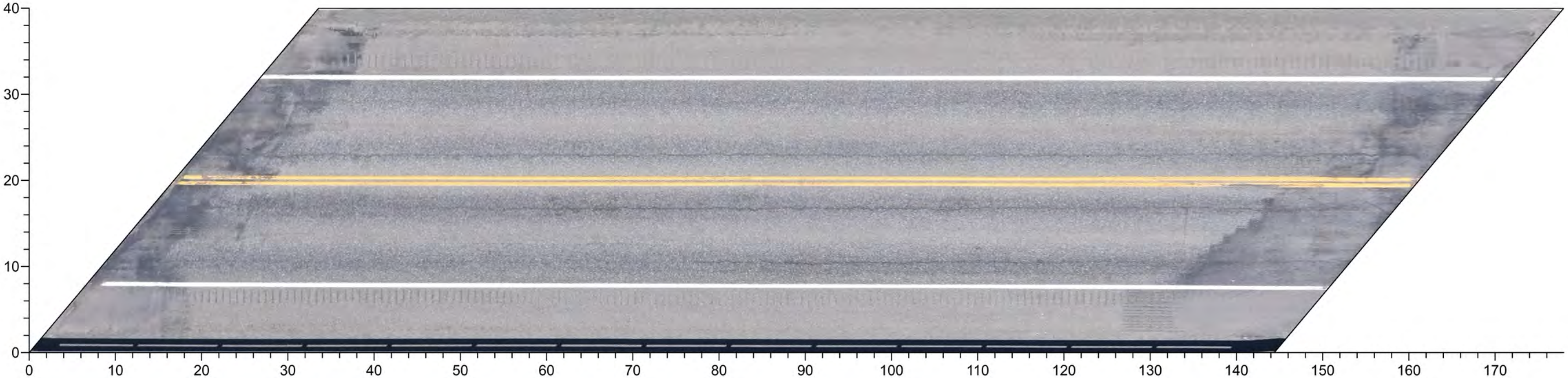
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.5	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1922 WASILLA OVERHEAD SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	31		

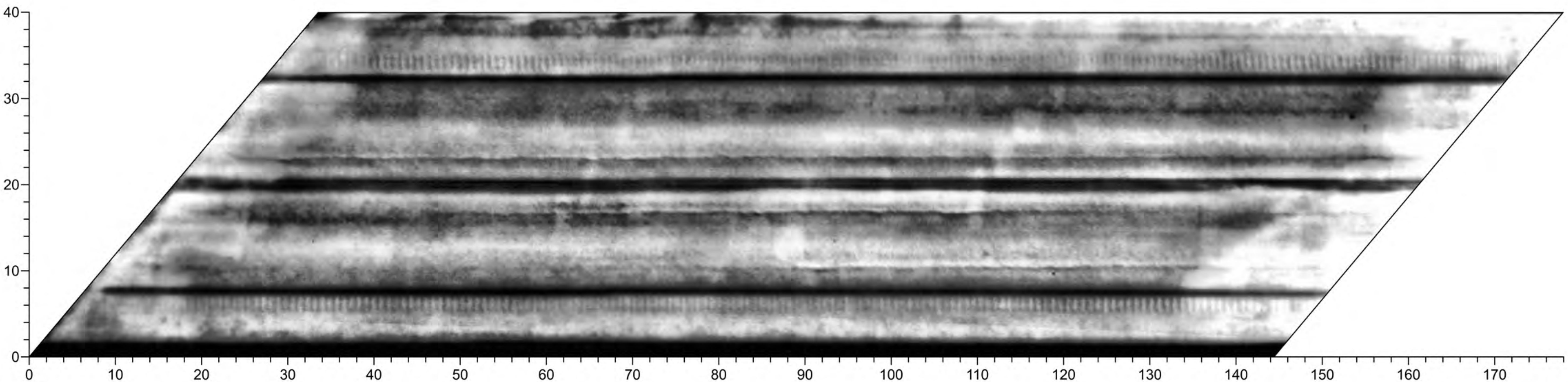




Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	3.3	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1923 WHITES CROSSING OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	592		

*Note: 59 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

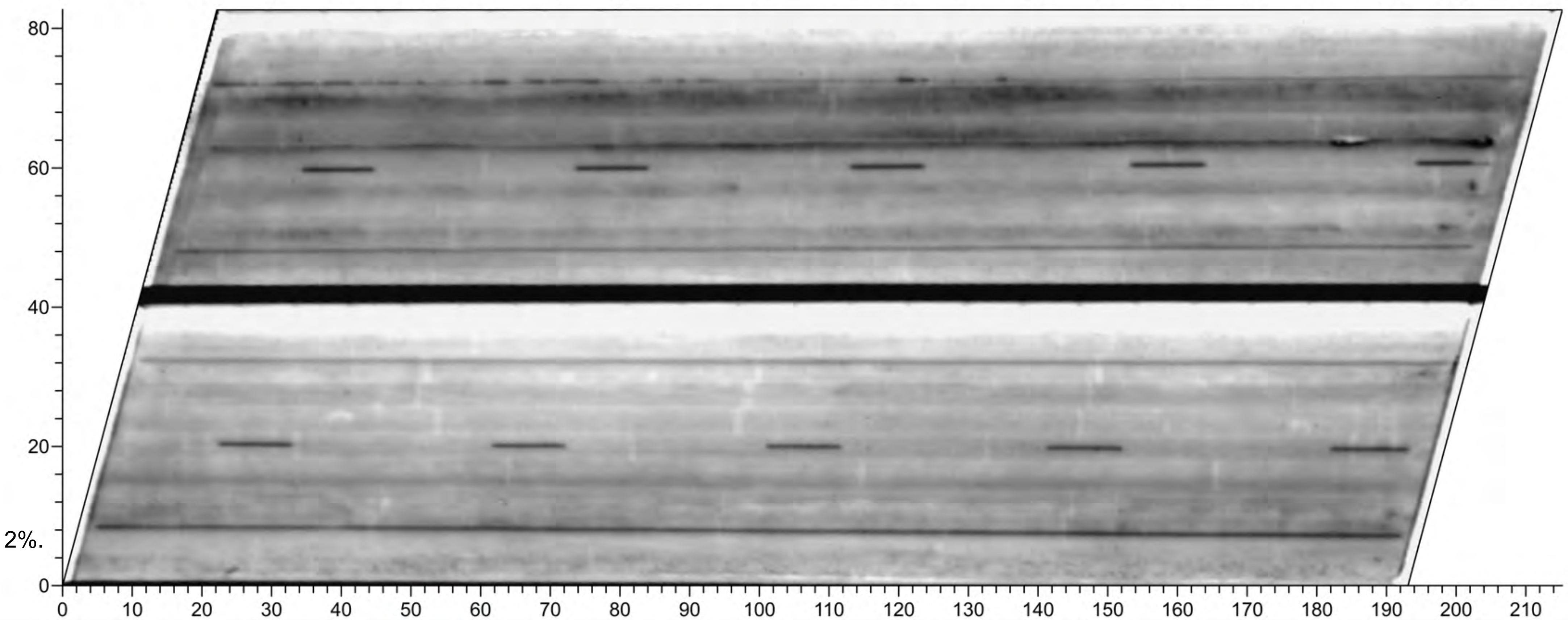




Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.4	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1980 MONDEROSA OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	24		

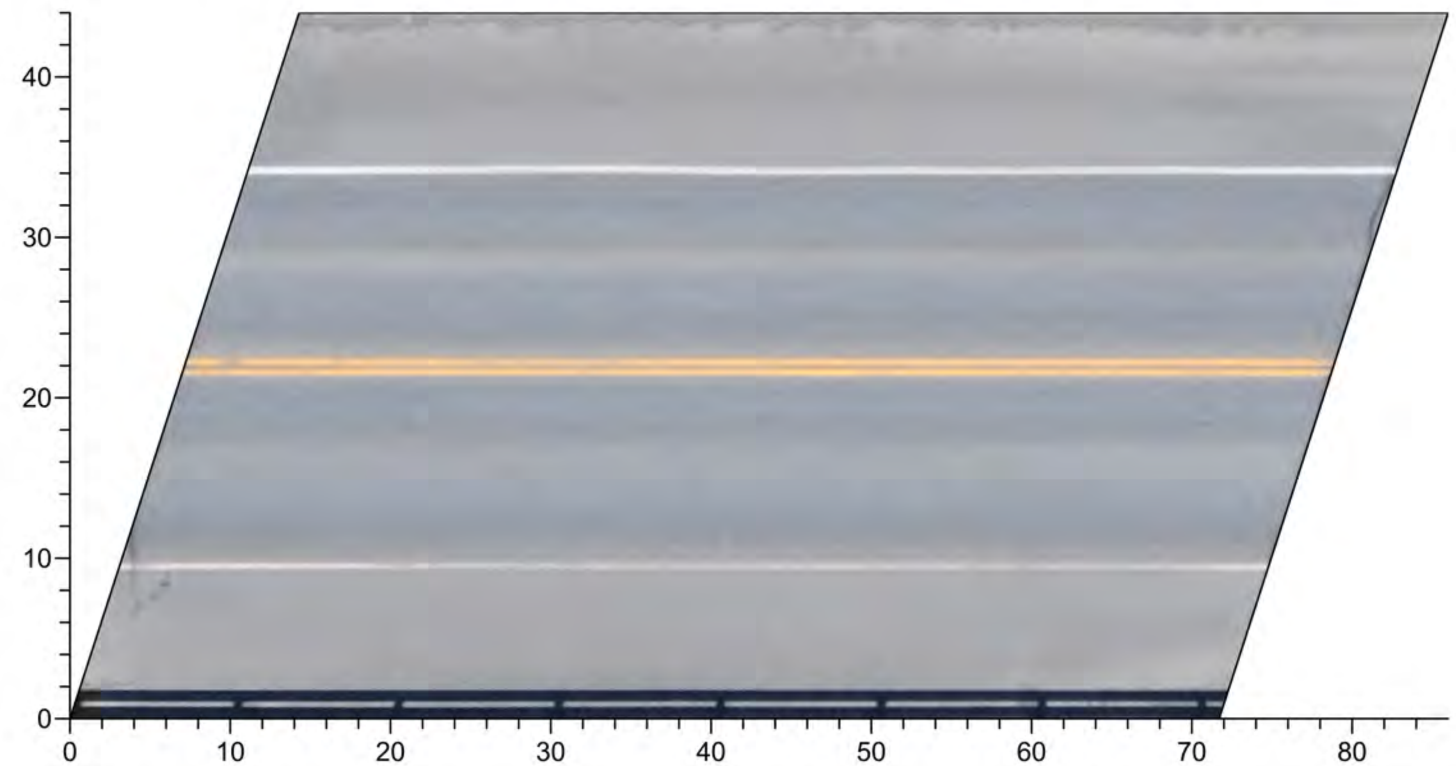
*Note: 184 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

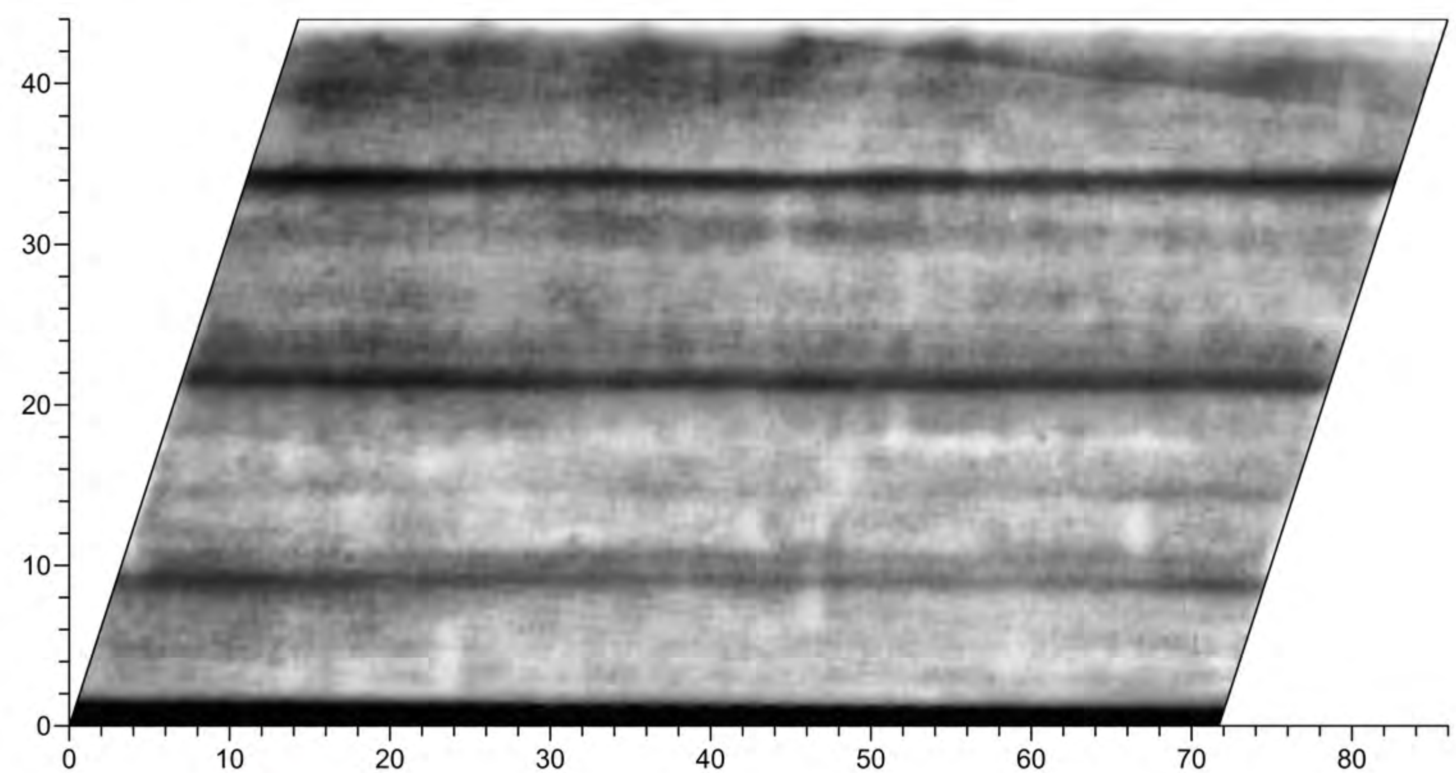


Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.6	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/6/22	Bridge No.: 1989 SEWARD MERIDIAN U.C. PARKS HIGHWAY
			Delamination Quantity (ft^2)	94		

*Note: 40 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

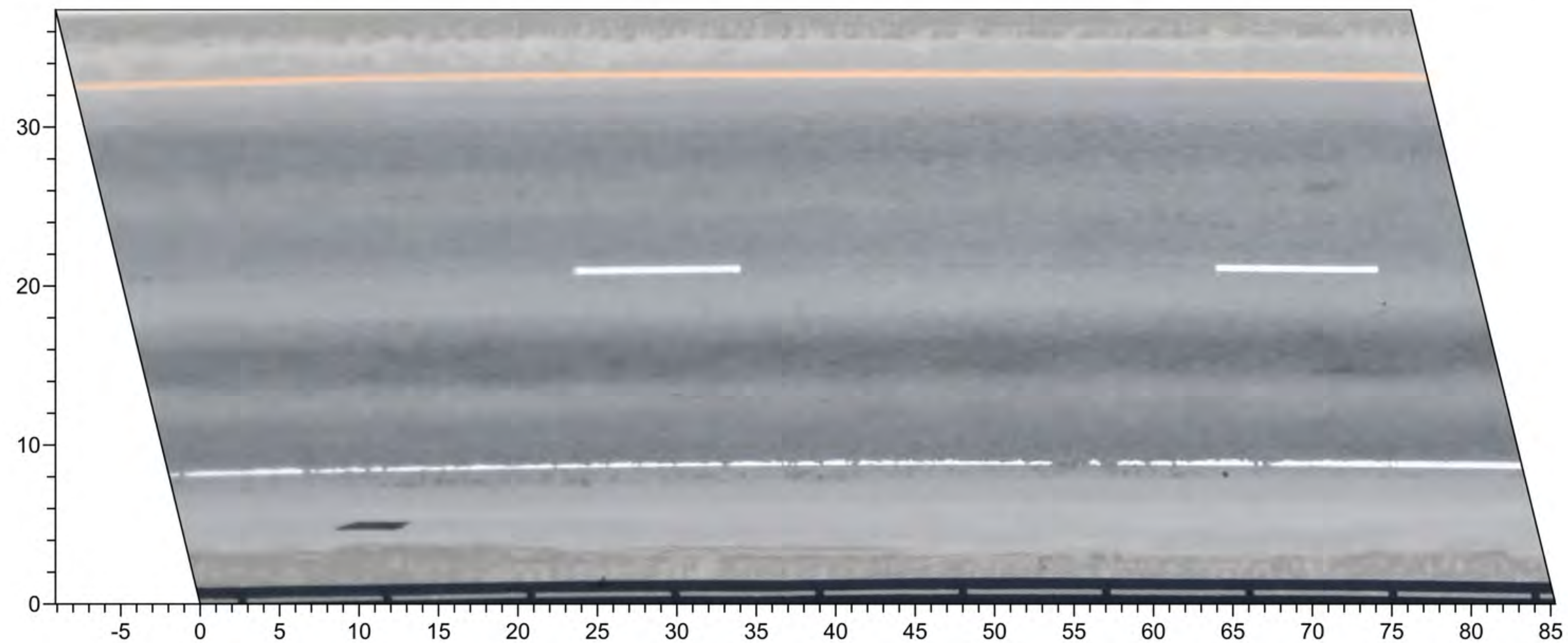


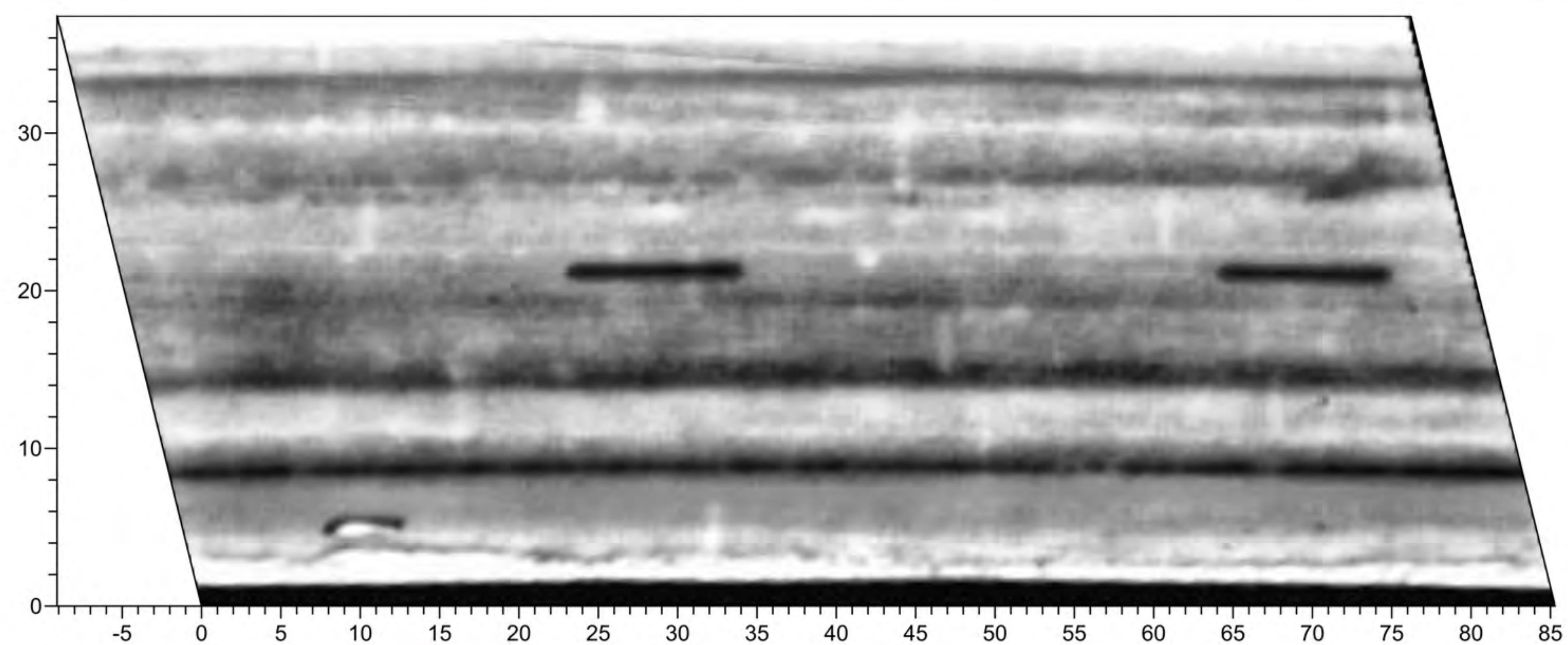


Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.3	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/6/22	Bridge No.: 1993 REX OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	9		

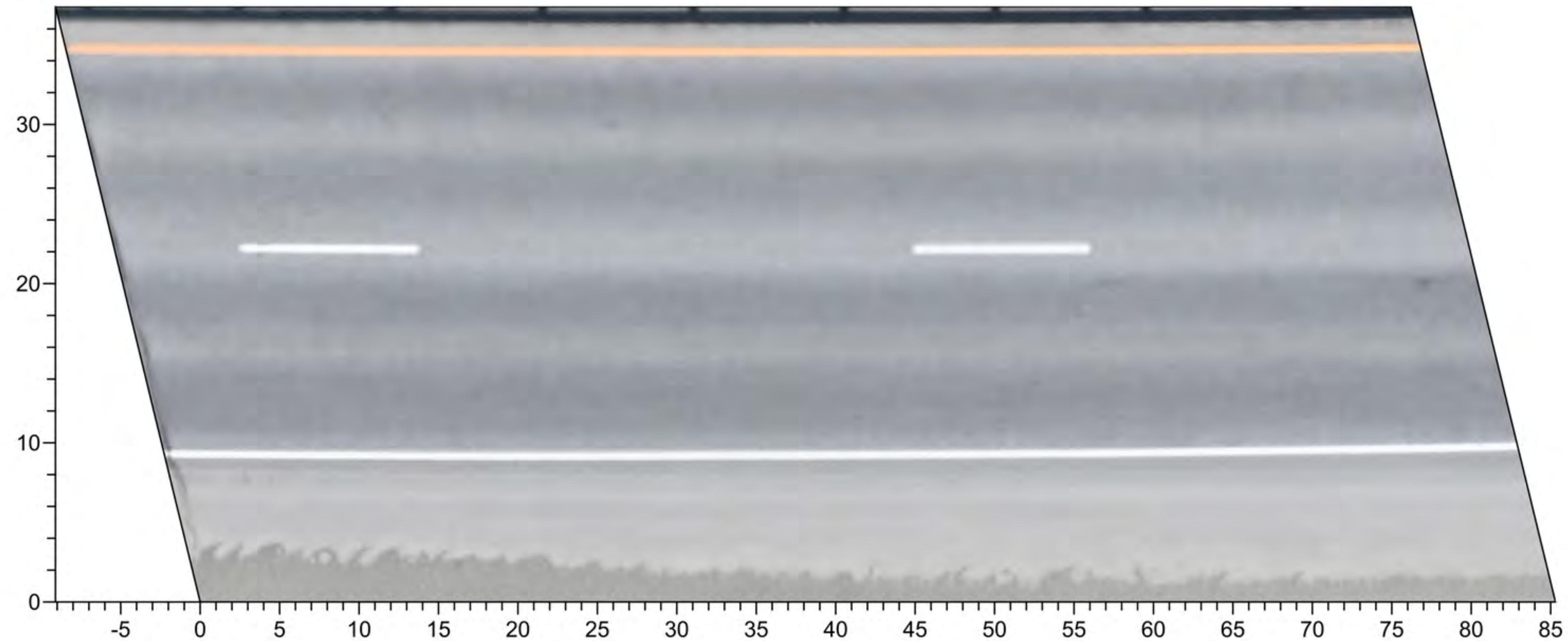
*Note: 44 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

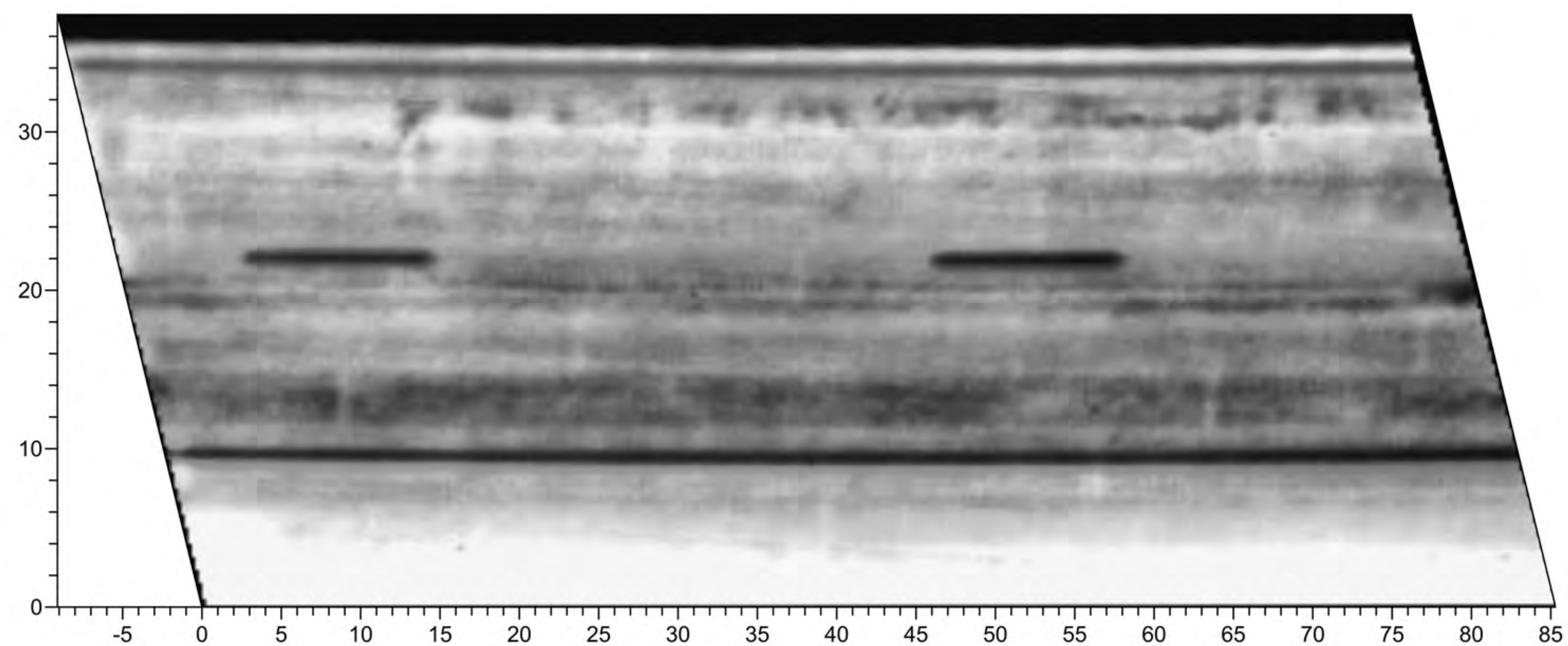




Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.0	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2031 WASILLA CR SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	32		

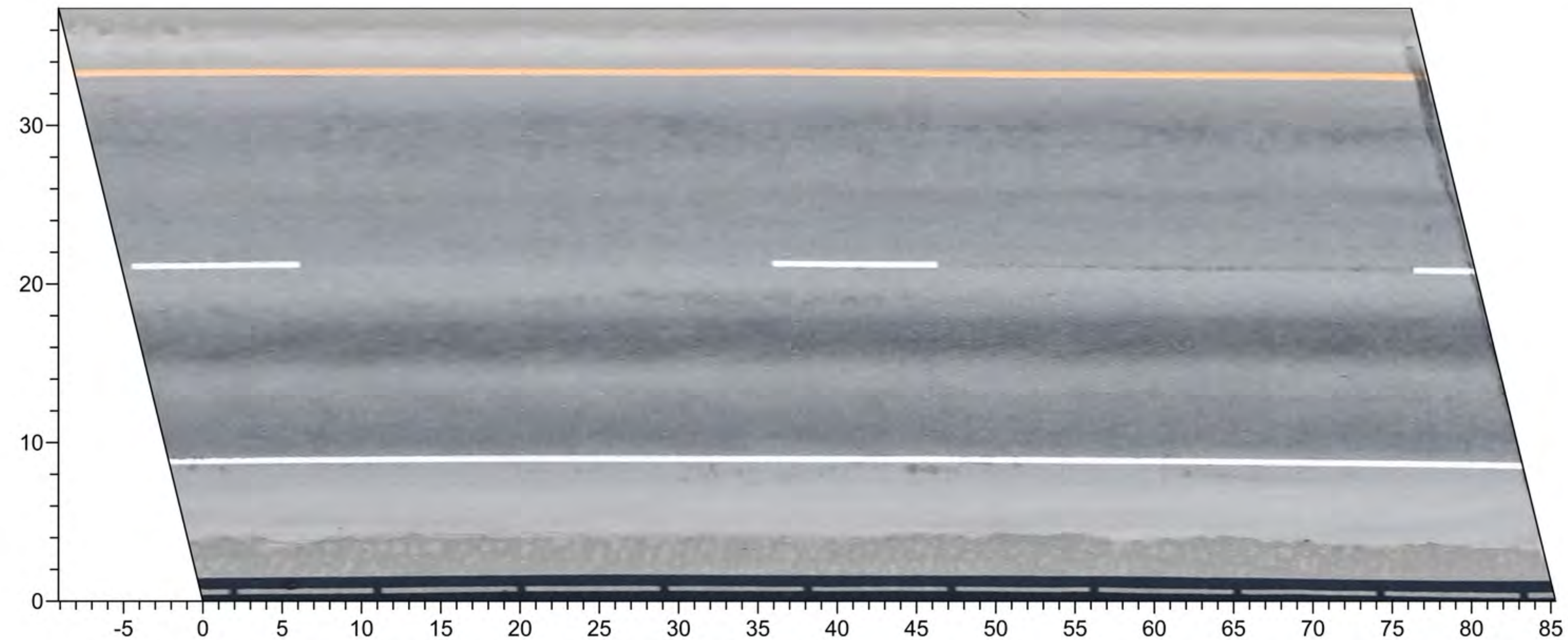


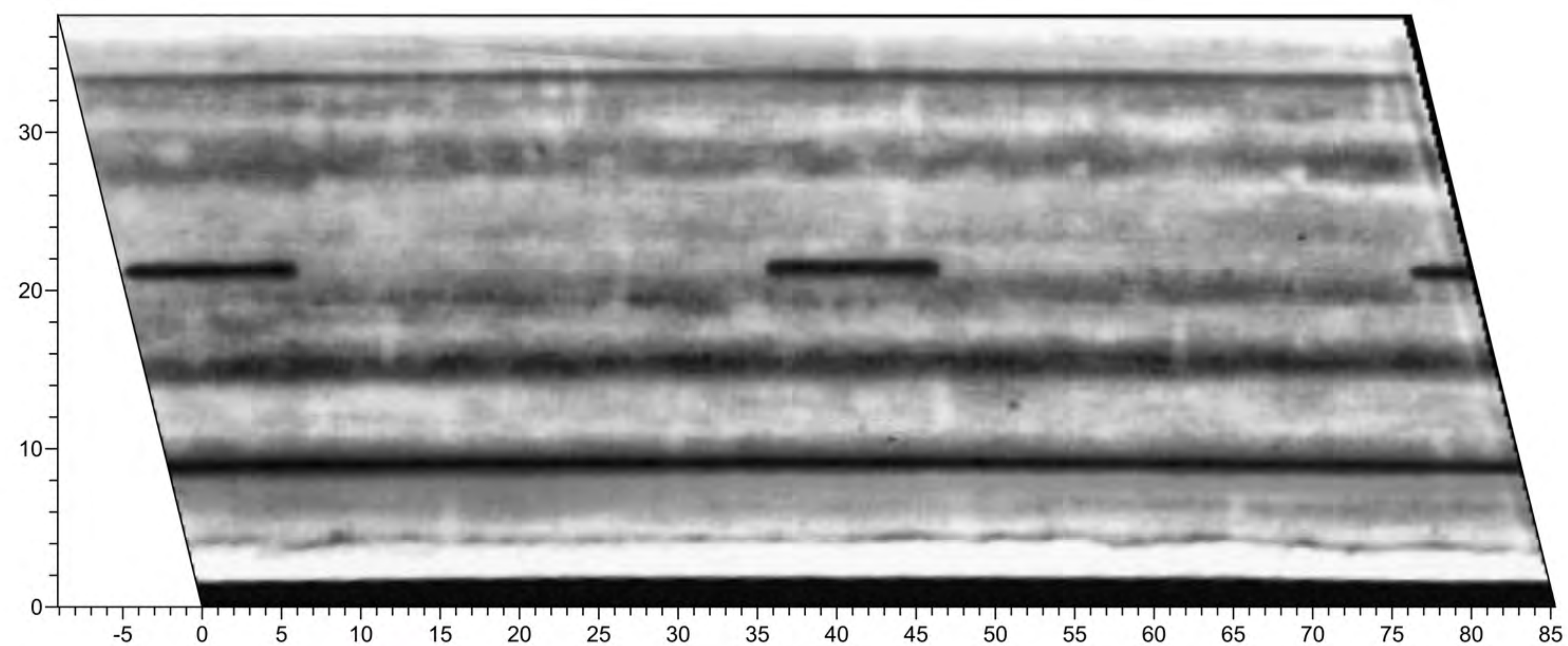


Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.6	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2032 WASILLA CR NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	52		

*Note: 51 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

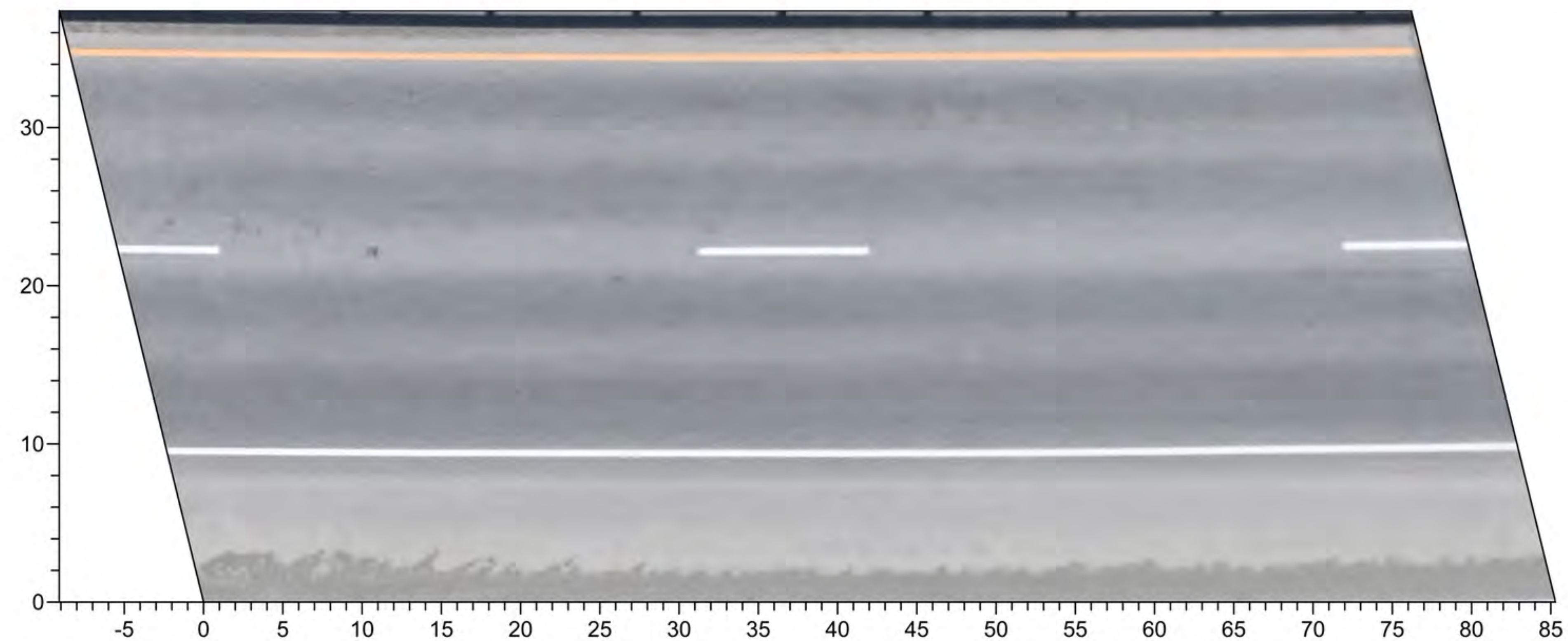


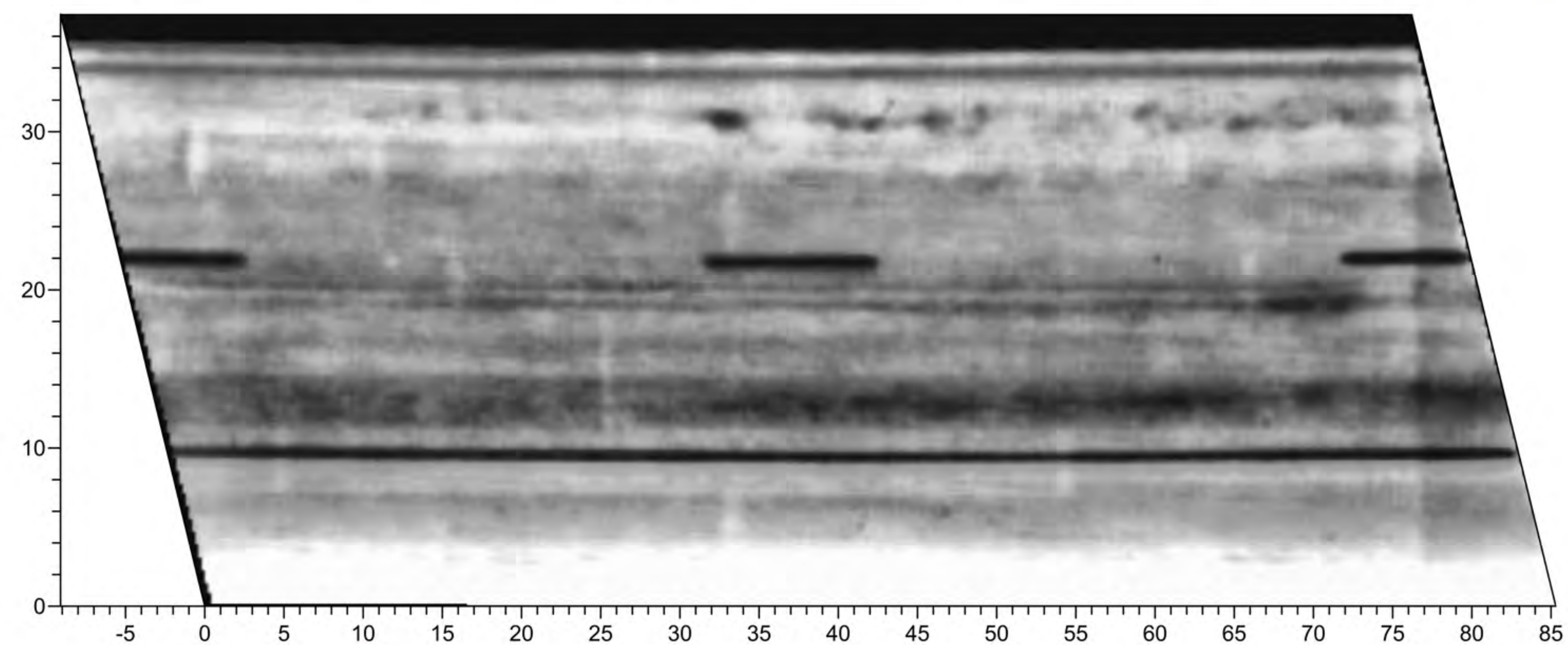


Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.9	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/11/22	Bridge No.: 2033 HYER RD UC SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	28		

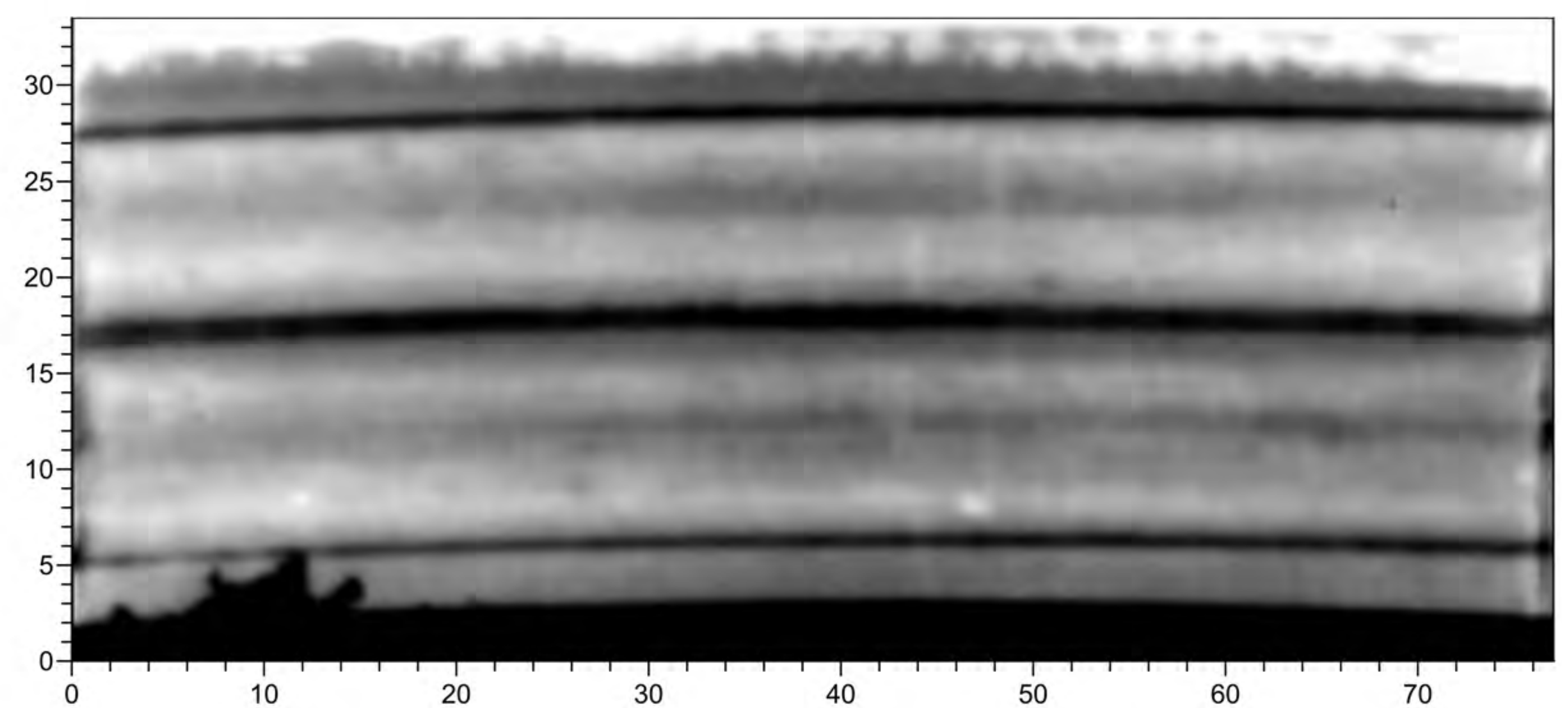
*Note: 66 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature





Note: Delamination locations not shown as quantity is less than 2%.

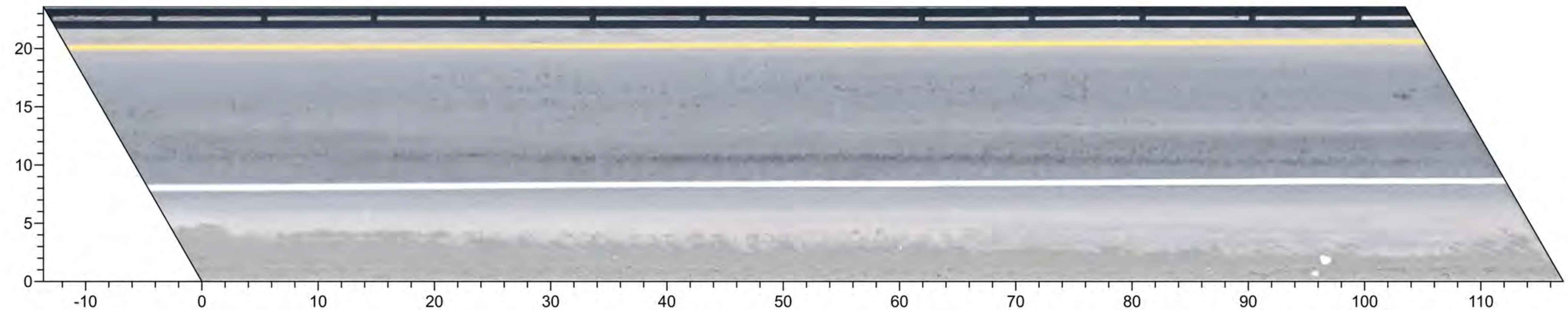
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.2	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2034 HYER RD UC NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	5		

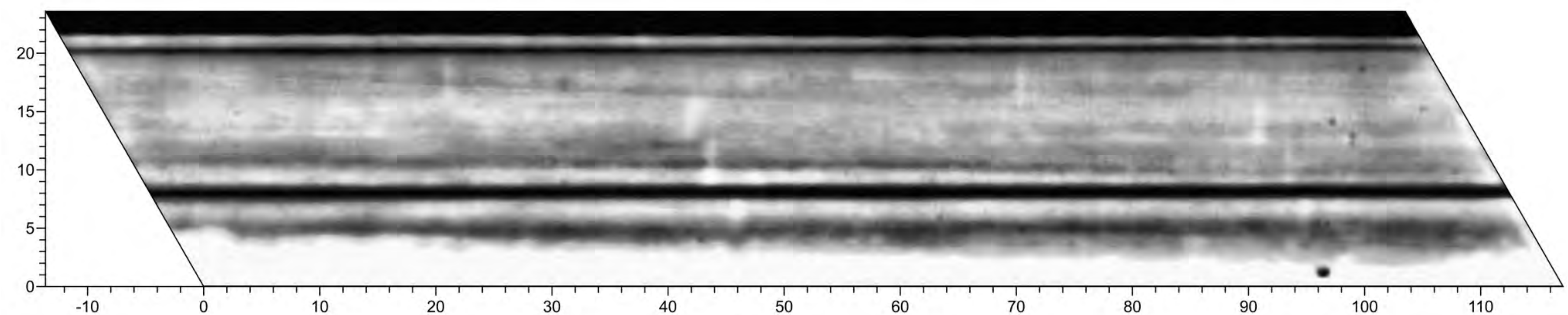


Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.3	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2035 WASILLA CR S. FRONTAGE PARKS HIGHWAY
			Delamination Quantity (ft^2)	34		

*Note: 47 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

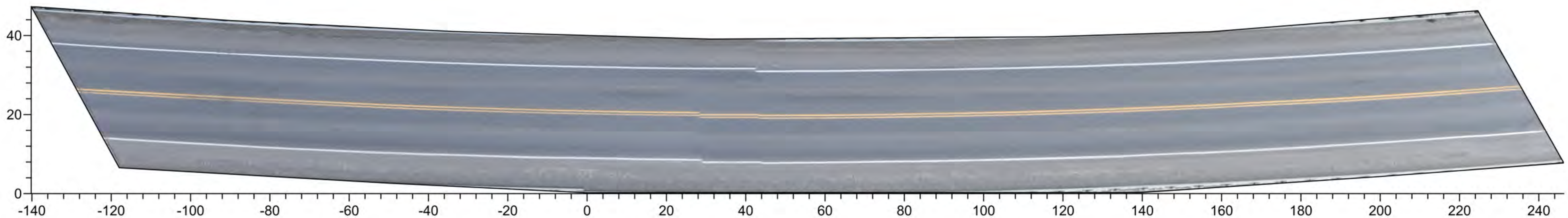


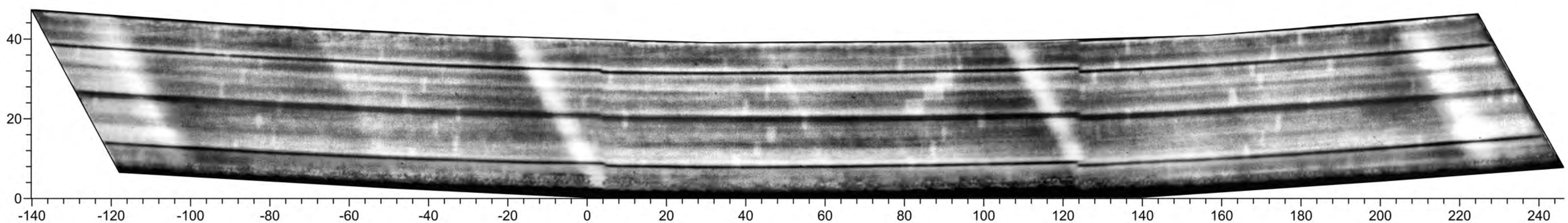


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.6	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2036 WASILLA CR NB RAMP PARKS HIGHWAY
			Delamination Quantity (ft^2)	16		

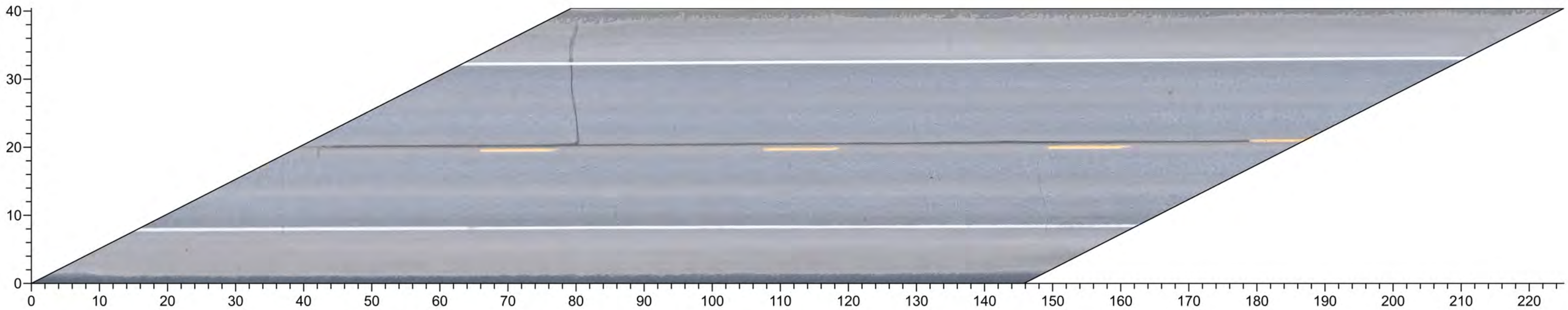
*<u>Note: 409 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature</u>

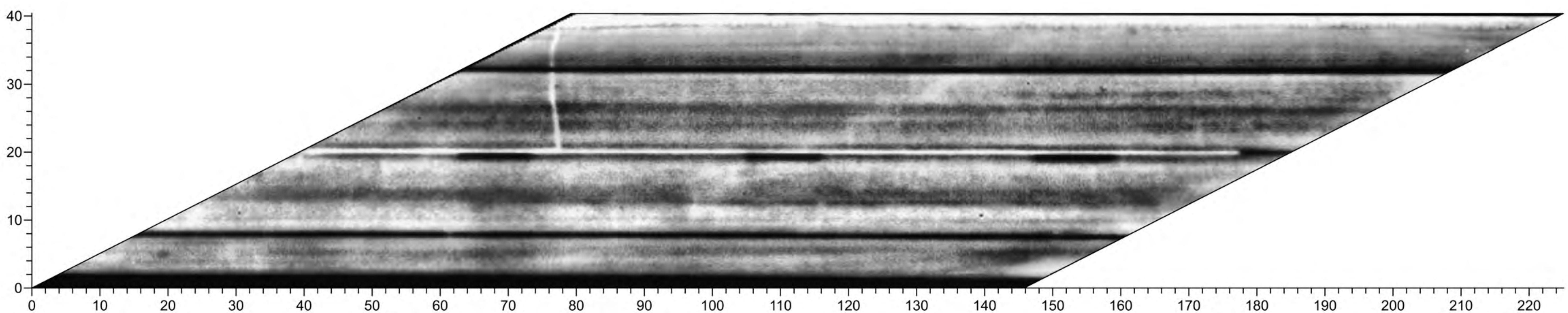




Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 25-ft 0 25		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.3	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2083 BROAD PASS OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	37		

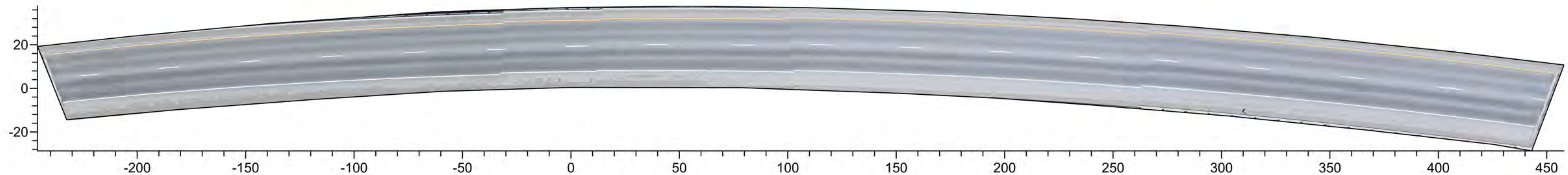


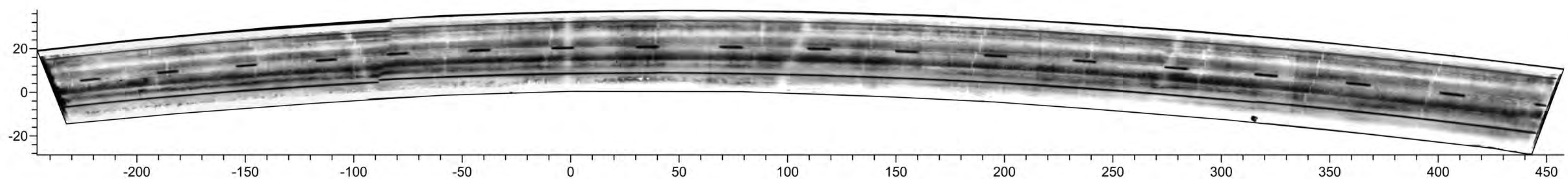


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.1	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2084 SUMMIT OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	67		

*Note: 321 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

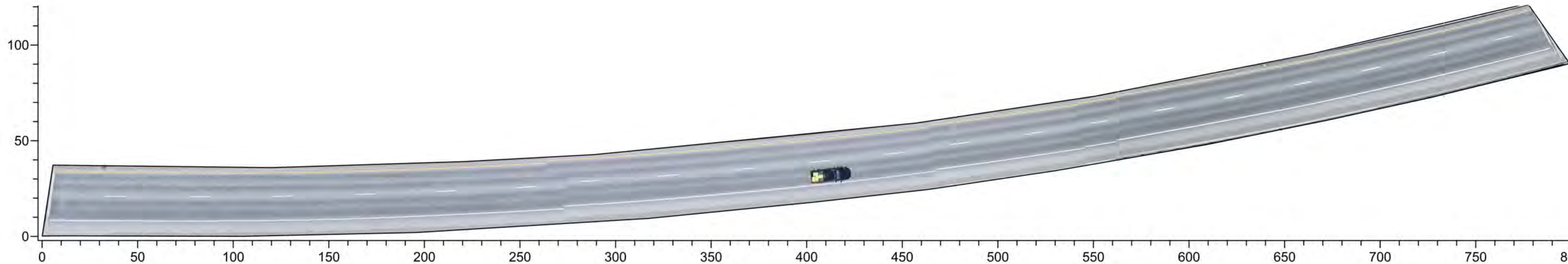


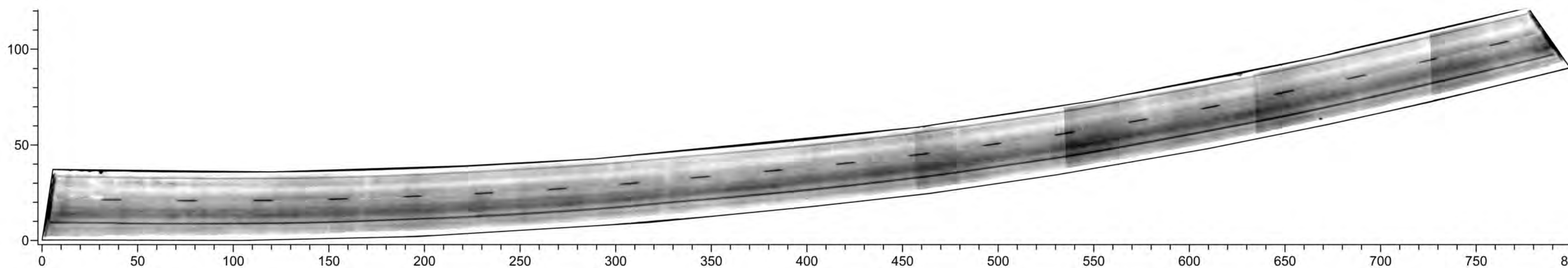


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 45-ft 0 45	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.3	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2115 SPRING CREEK SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	90		

*<u>Note: 155 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature</u>

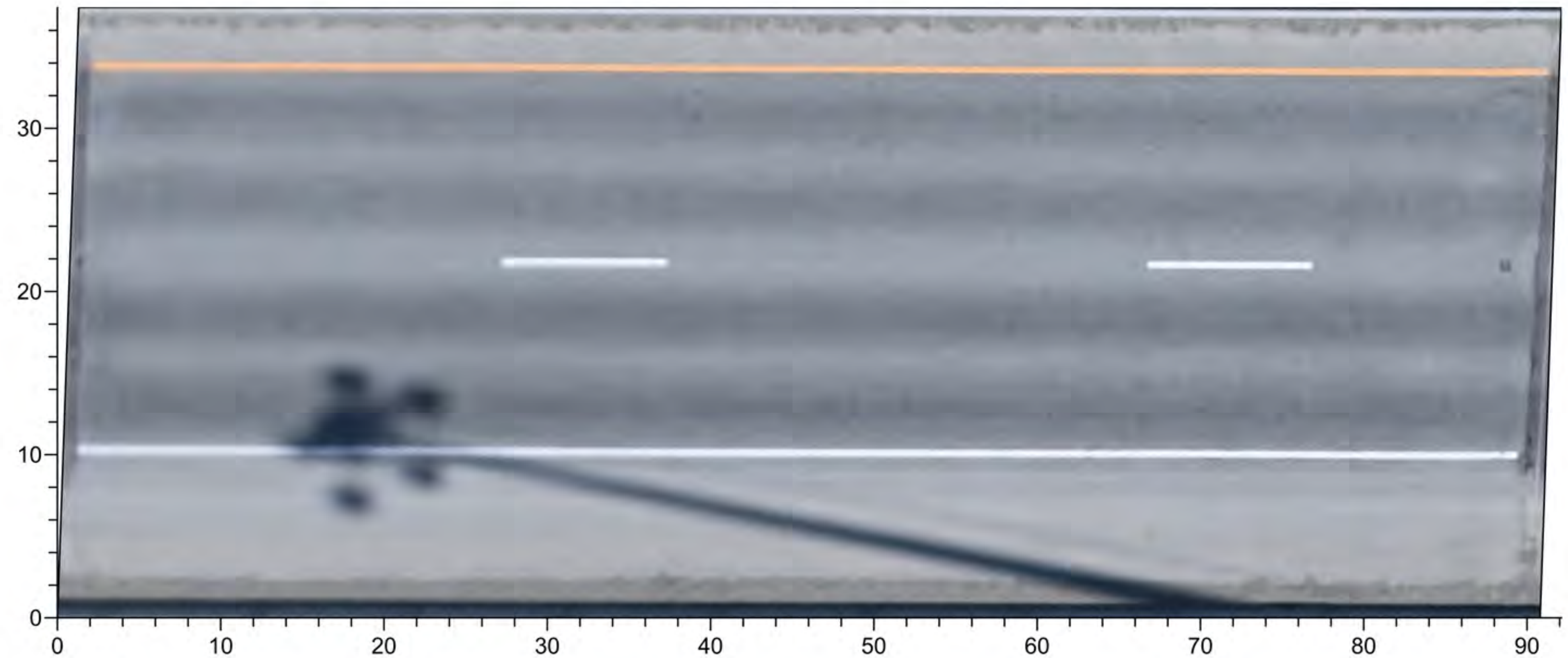


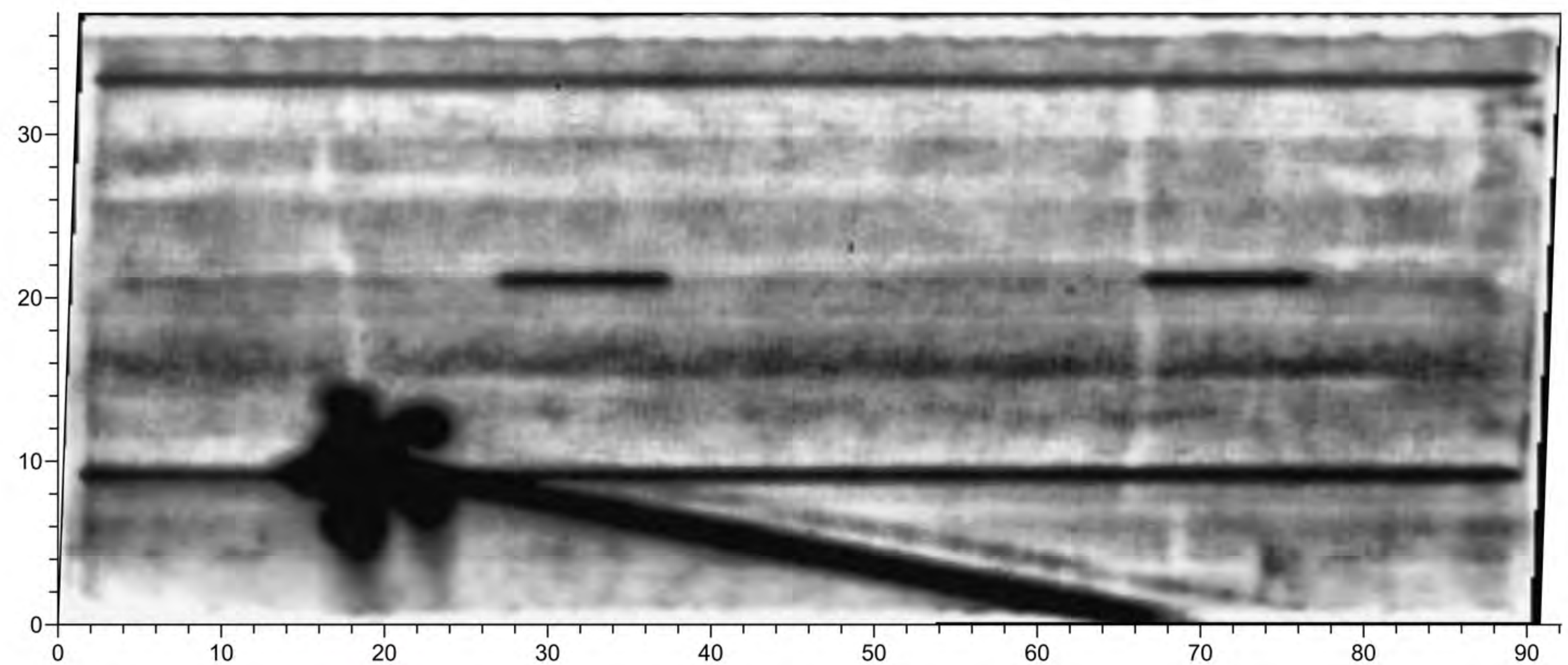


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 50-ft 0 50	N ⇒	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.7	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/11/22	Bridge No.: 2116 SPRING CREEK NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	219		

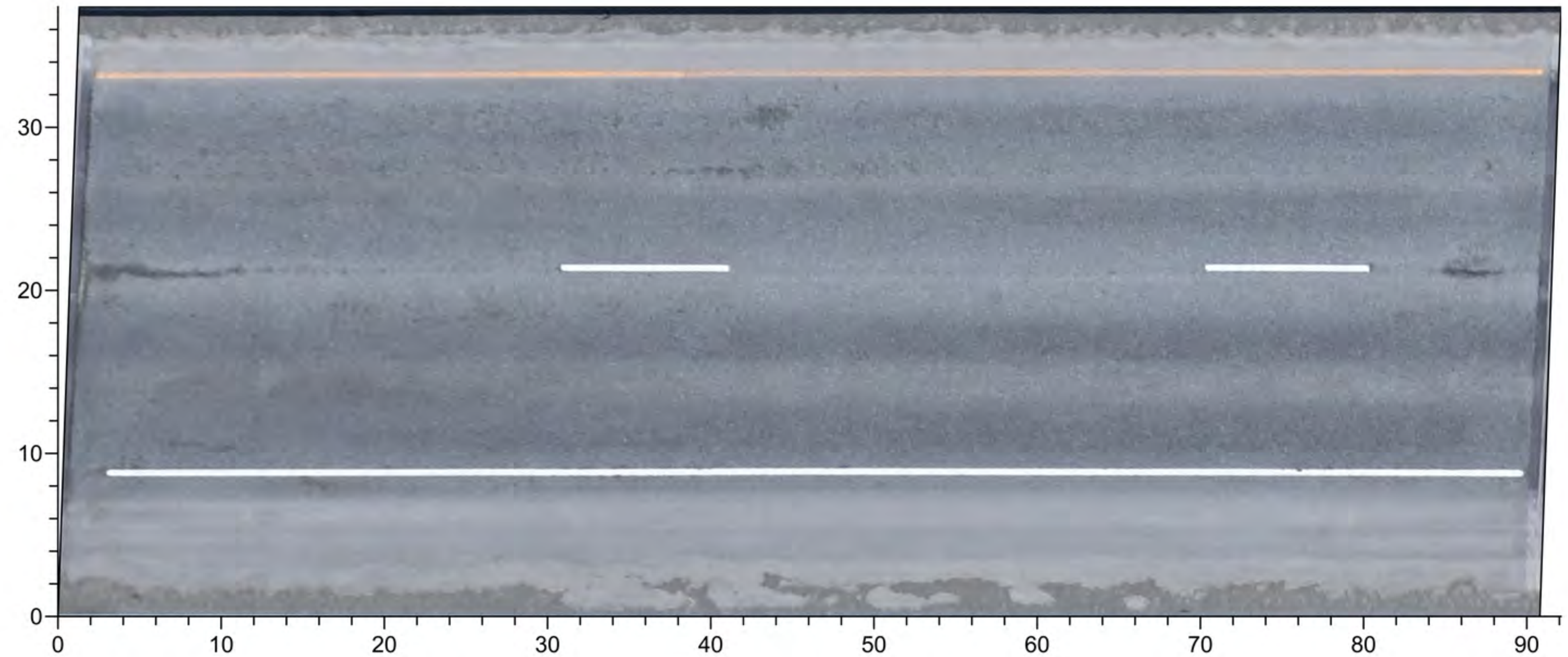
*Note: 63 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

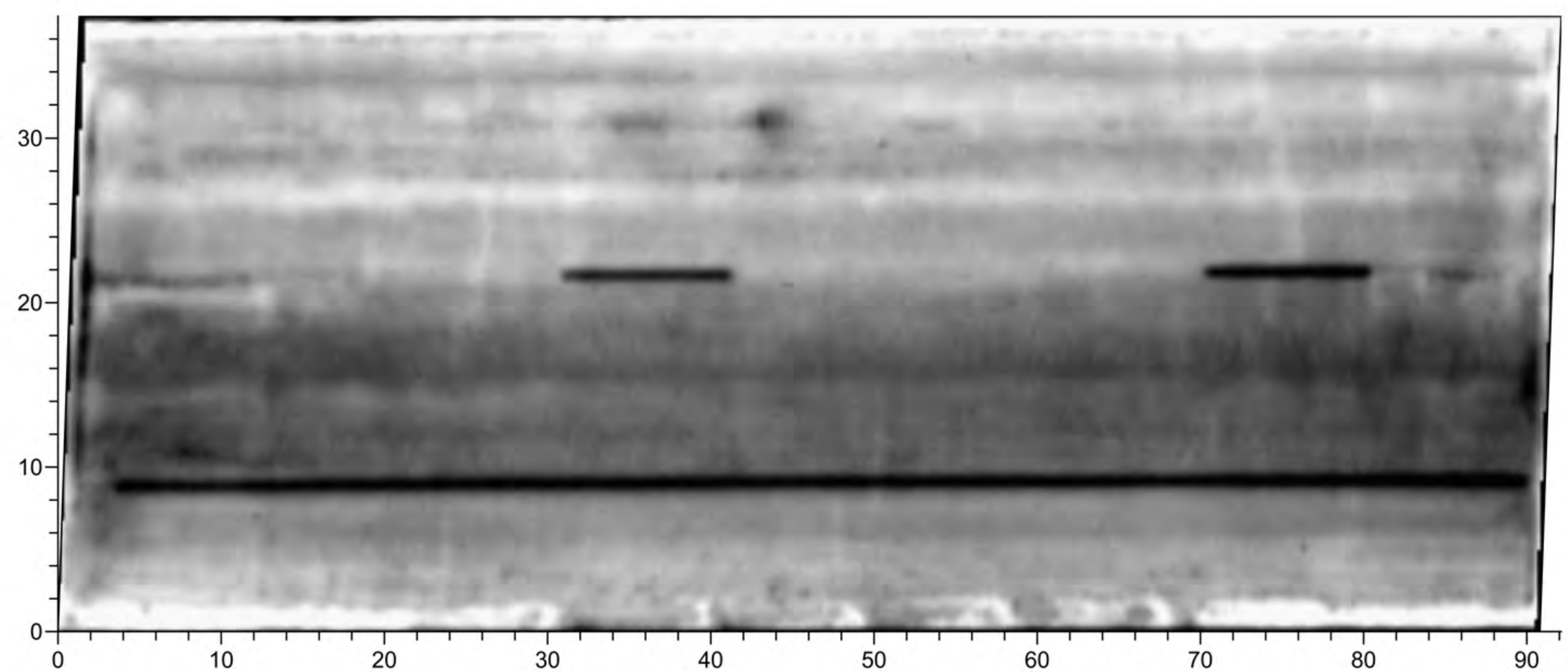




Note: Delamination locations
not shown as quantity is less than 2%.

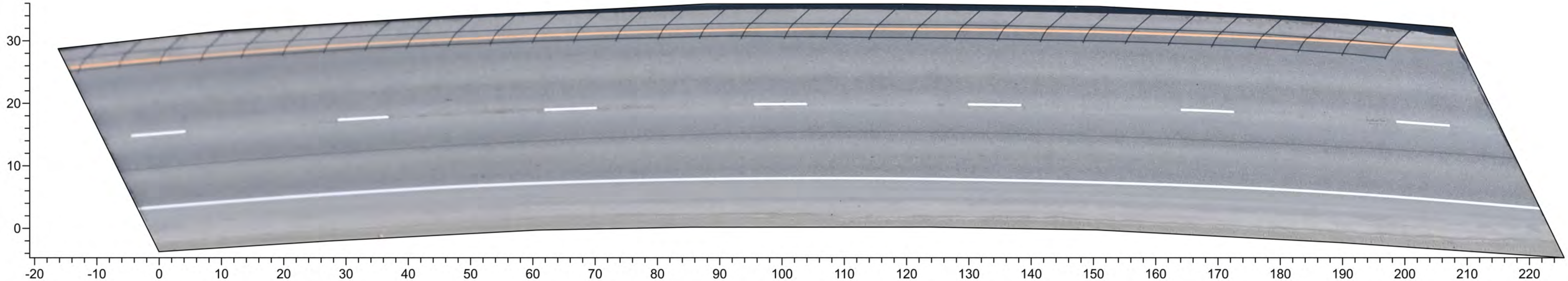
Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10	N	Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.8	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2117 GLENN PARKS OVERHEAD SB PARKS HIGHWAY
			Delamination Quantity (ft^2)	26		

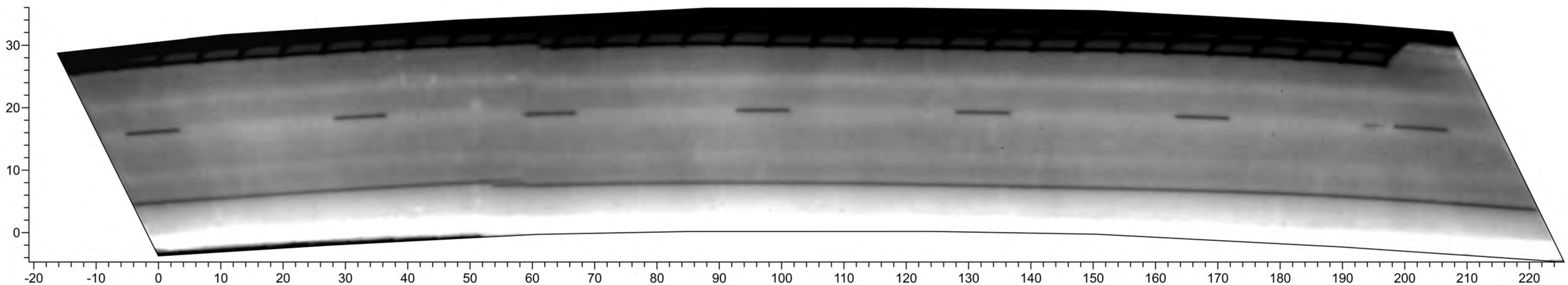




Note: Delamination locations
not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 10-ft 0 10		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	1.5	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2118 GLENN PARKS OVERHEAD NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	52		

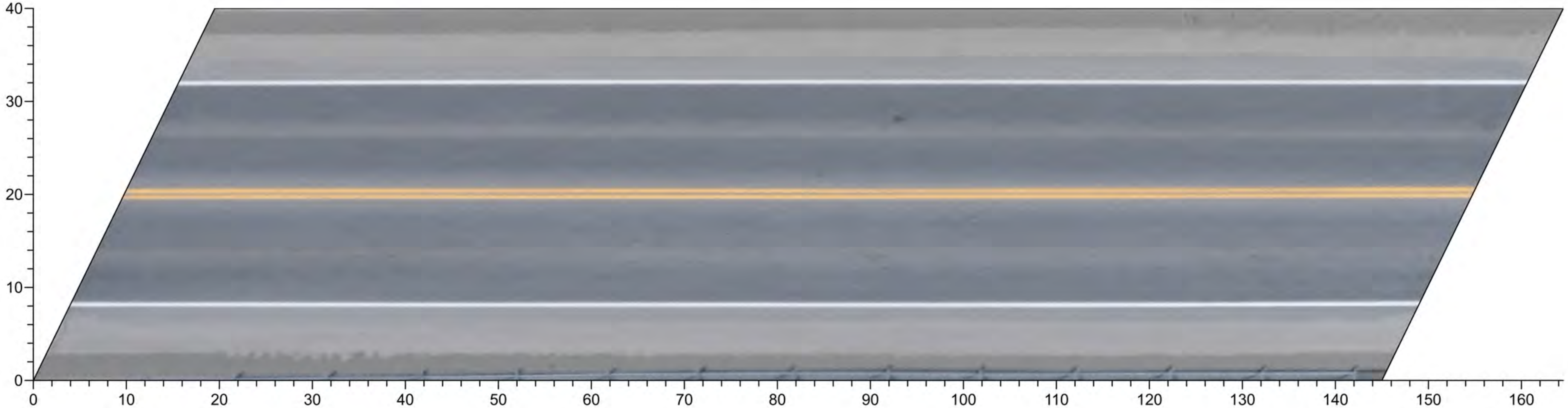


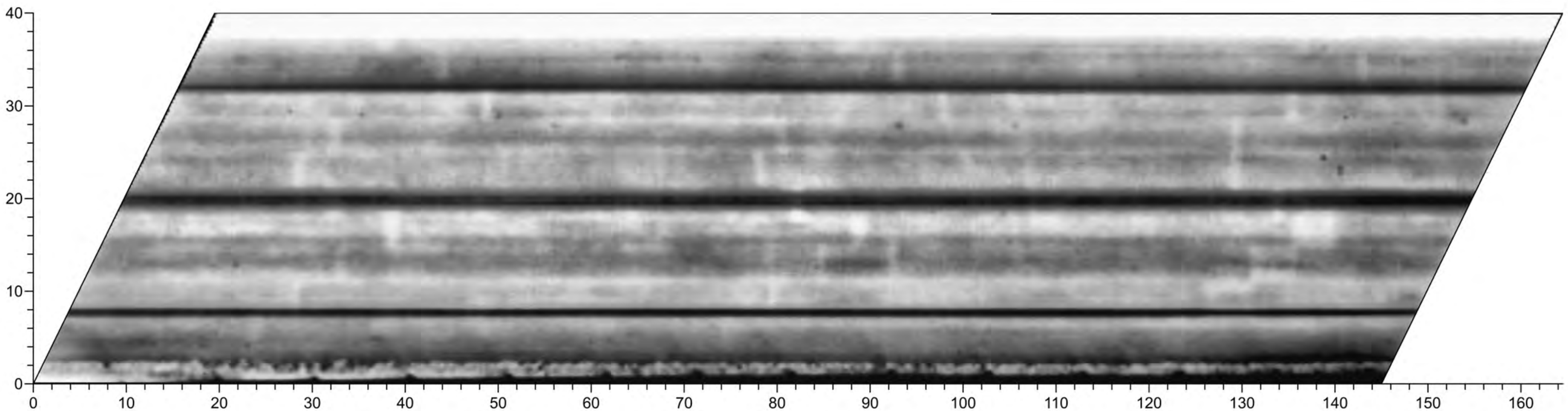


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 15-ft 0 15		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.3	Imagery Collected: 6/5/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2291 WASILLA OVERHEAD NB PARKS HIGHWAY
			Delamination Quantity (ft^2)	21		

*Note: 160 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature



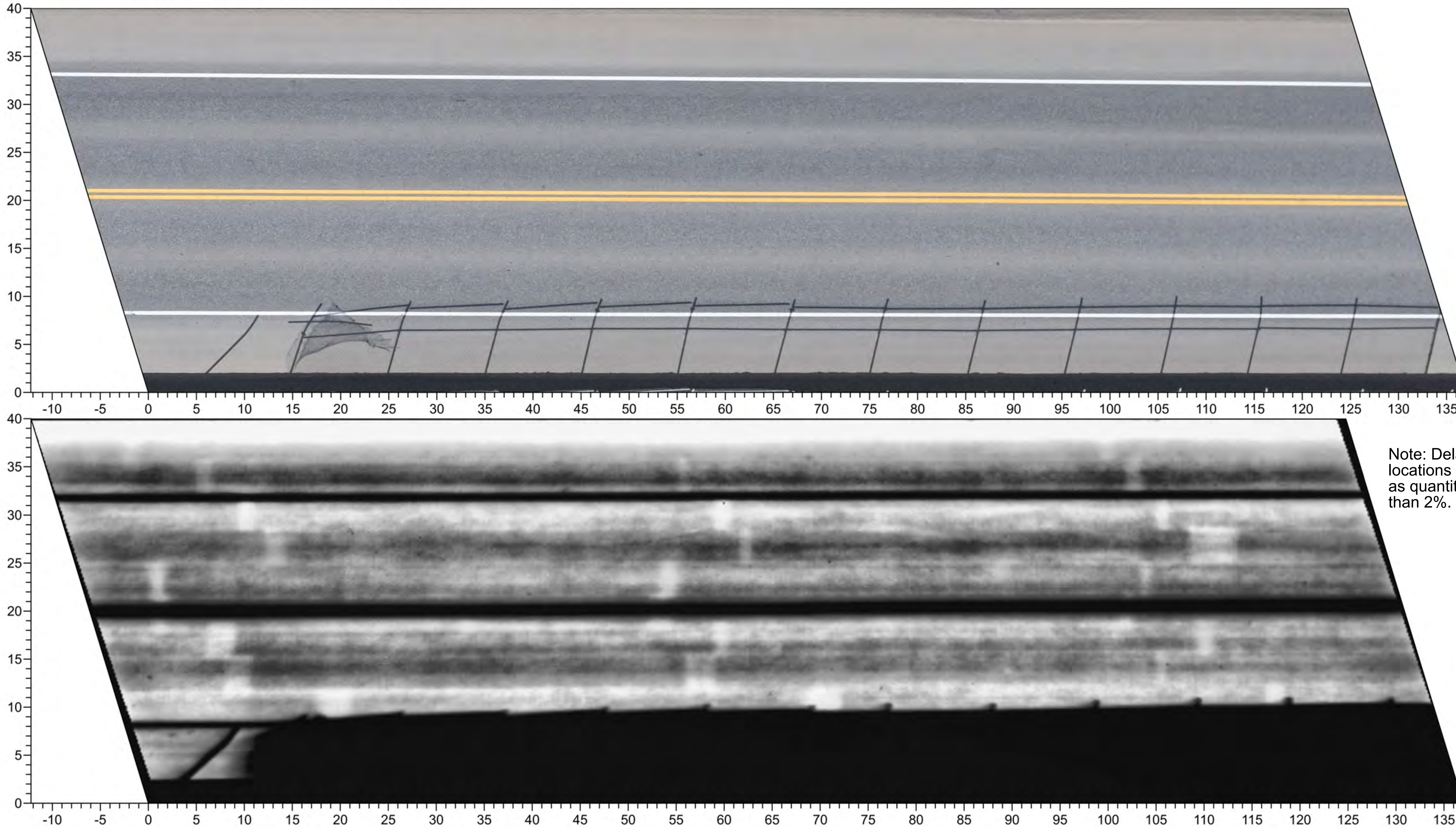


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.2	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2311 MONTANA OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	9		

*Note: 196 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature

*Note: Analysis limited by shadow from barrier/chain-link fence

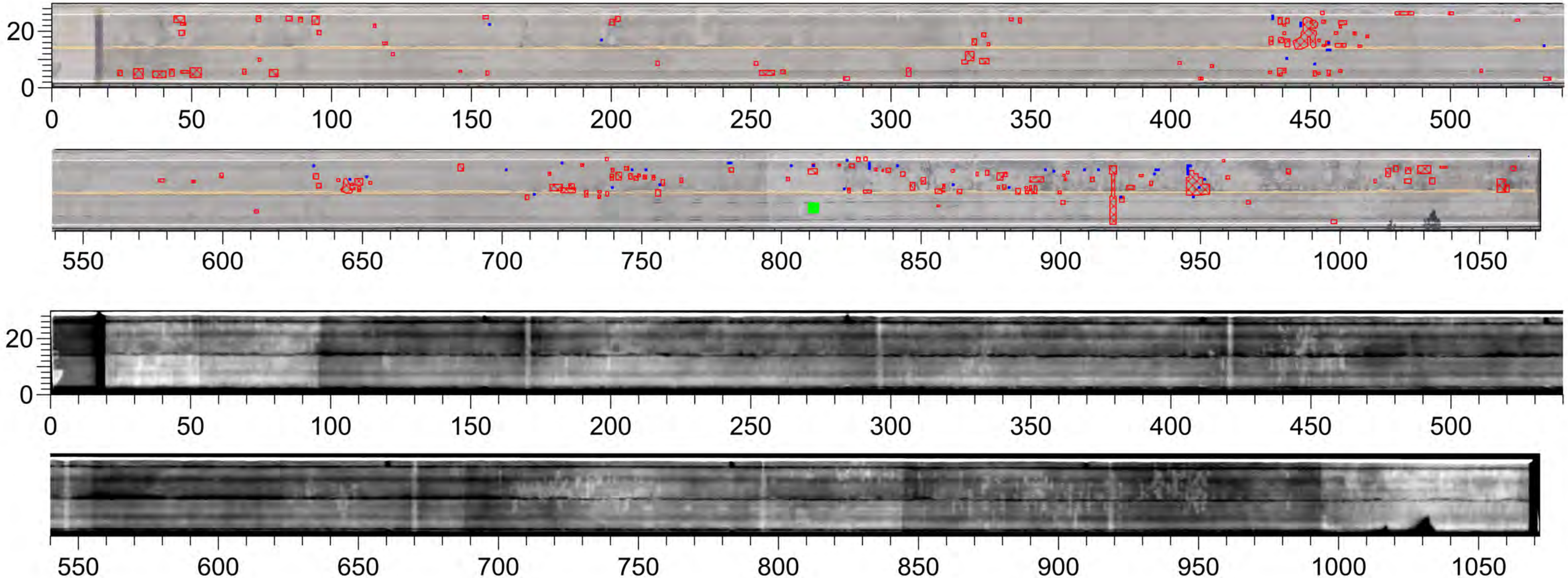


Note: Delamination locations not shown as quantity is less than 2%.

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 12-ft 0 12		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	0.2	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/5/22	Bridge No.: 2312 SUNSHINE OVERHEAD PARKS HIGHWAY
			Delamination Quantity (ft^2)	14		

APPENDIX D - Aerial IR vs. Chain-Drag Results

*Note: 948 sq. ft. of thermal anomalies not mapped due to being rectilinear in shape and appearing more like subsurface patching or some other structural feature



Chain Drag Delamination Quantity (%)	Chain Drag Delamination Quantity (ft²)	Chain Drag Patching Quantity (%)	Chain Drag Patching Quantity (ft²)
0.2	50	0.1	16

Chain Drag Mapping Key

Delamination

Open Spall

Delamination With Areas of Spalling

Patching

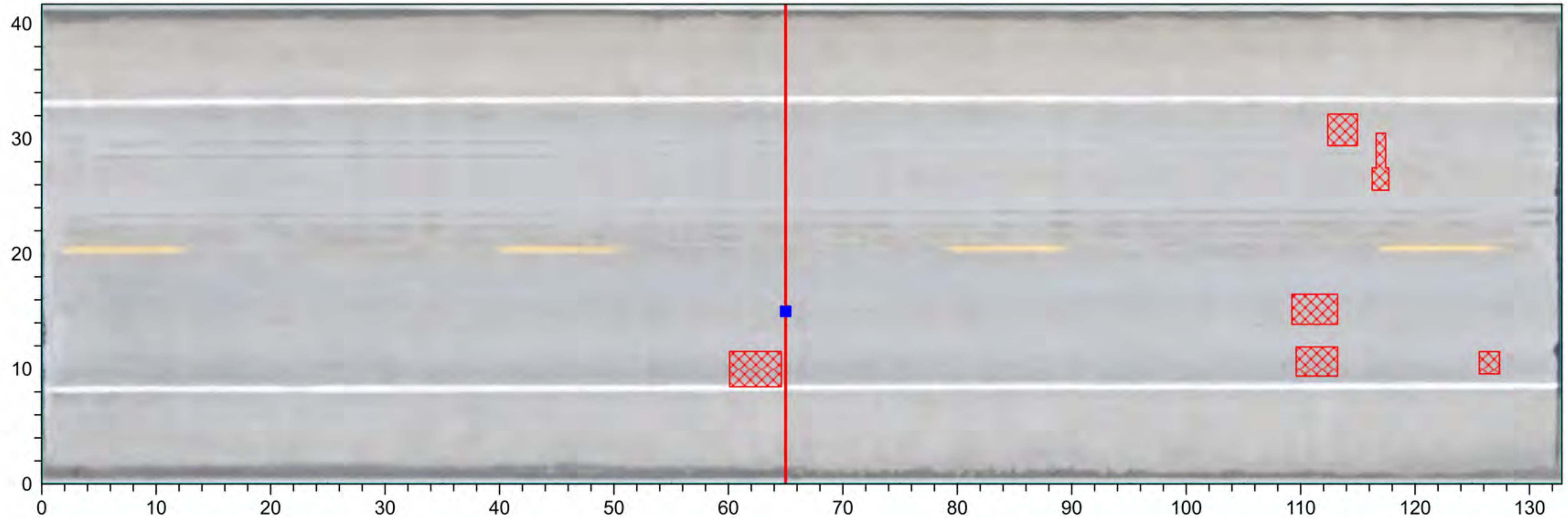
Area of Failed Overlay

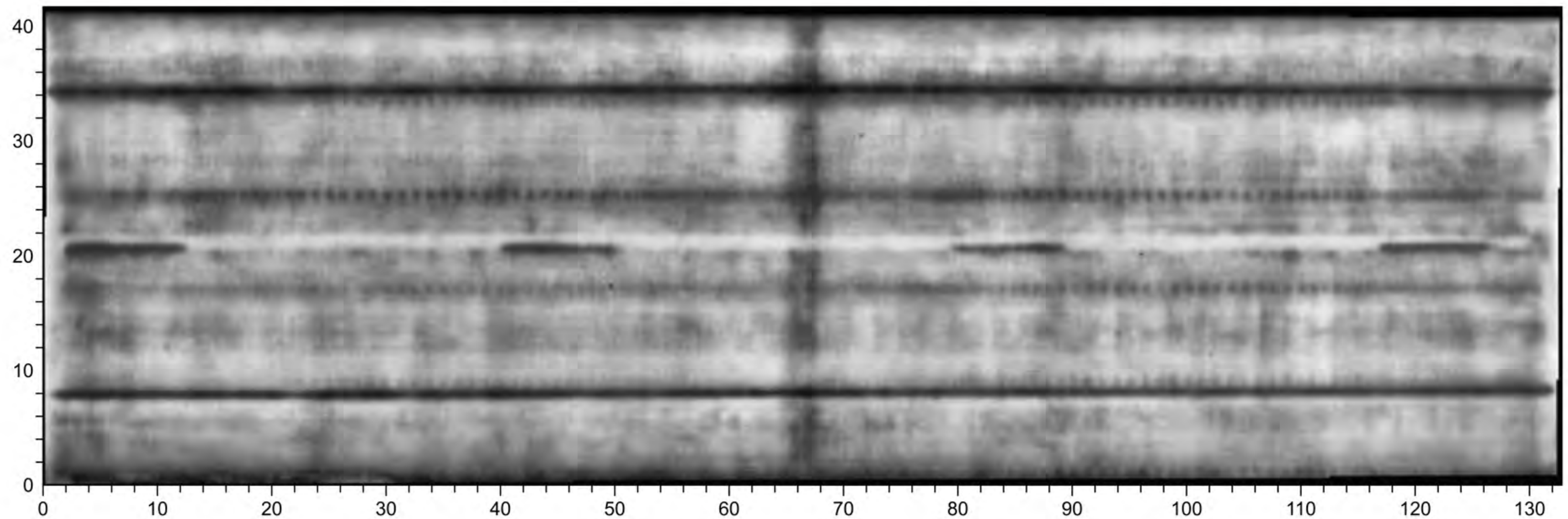
Delamination with Area of Failed Overlay

Delamination, Area of Failed Overlay, Spalling

Crack With Edge Spalling

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 35-ft 0 35		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	2.1	Imagery Collected: 6/4/22 Analyzed by: SB Reviewed by: AJC Completed: 10/12/22	Bridge No.: 0254 SUSITNA RIVER PARKS HIGHWAY
			Delamination Quantity (ft²)	660		





Chain Drag Delamination Quantity (%)	<0.1
Chain Drag Delamination Quantity (ft^2)	1

Chain Drag Mapping Key

Delamination

Open Spall

Delamination With Areas of Spalling

Patching

Area of Failed Overlay

Delamination with Area of Failed Overlay

Delamination, Area of Failed Overlay, Spalling

Crack With Edge Spalling

Scale

1-in = 12-ft

0 12

Orientation

Delaminations Detected by Aerial Infrared

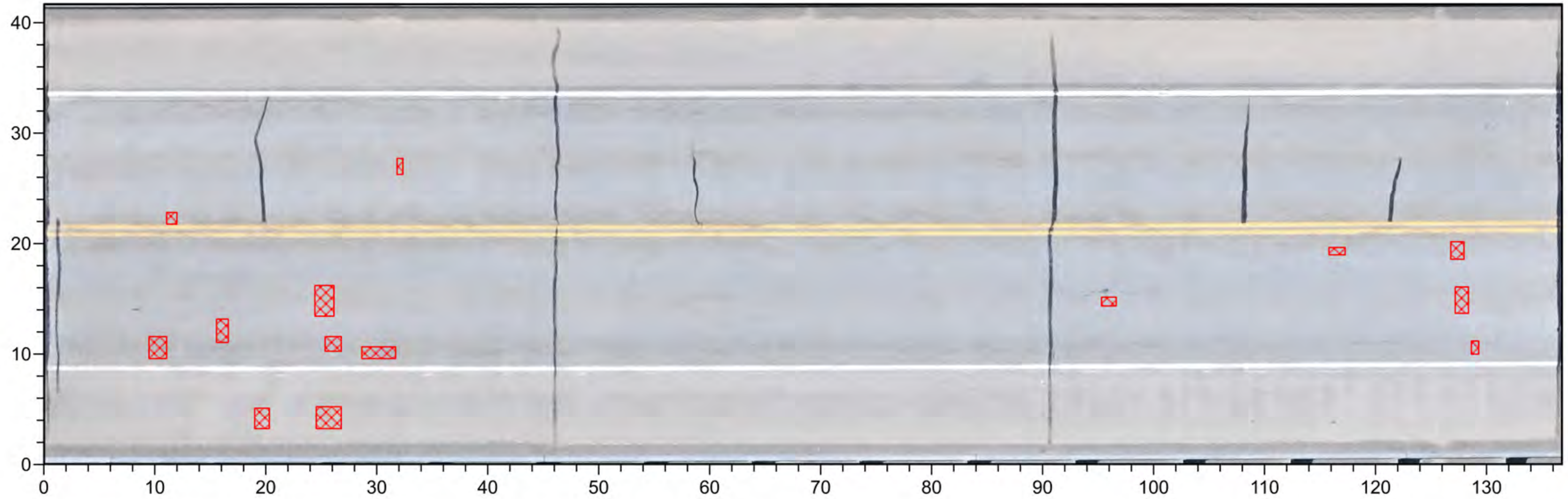
Quantity Summary

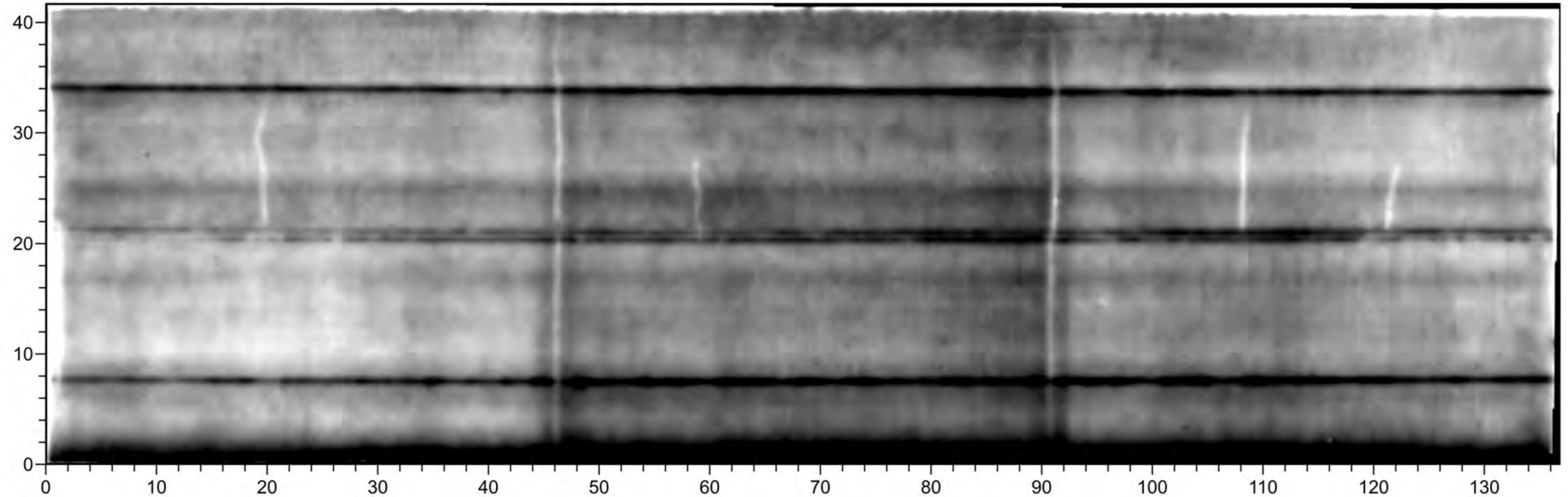
Delamination Quantity (%)	0.9
Delamination Quantity (ft^2)	49

Analysis Information

Imagery Collected: 6/4/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/4/22

Bridge No.: 0256
TROUBLESOME CREEK
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	0.0
Chain Drag Delamination Quantity (ft^2)	0

Chain Drag Mapping Key

Delamination | Open Spall | Delamination With Areas of Spalling | Patching | Area of Failed Overlay | Delamination with Area of Failed Overlay | Delamination, Area of Failed Overlay, Spalling | Crack With Edge Spalling

Scale

1-in = 12-ft

0 12

Orientation

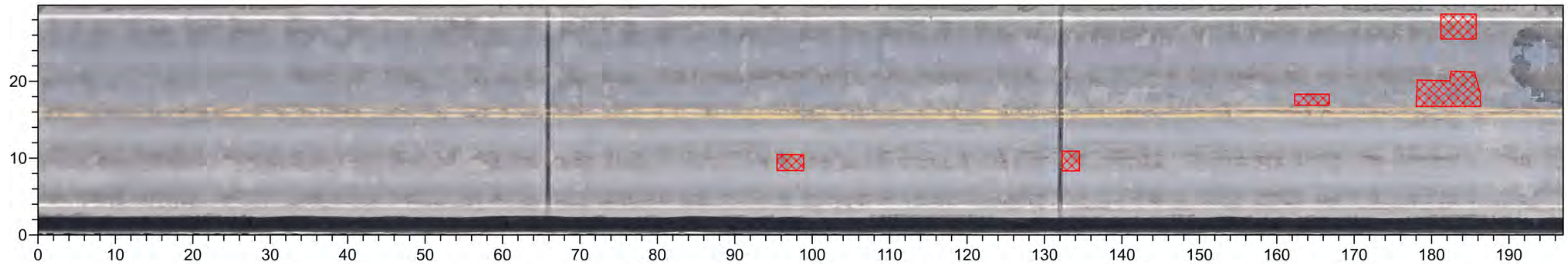
Delaminations Detected by Aerial Infrared

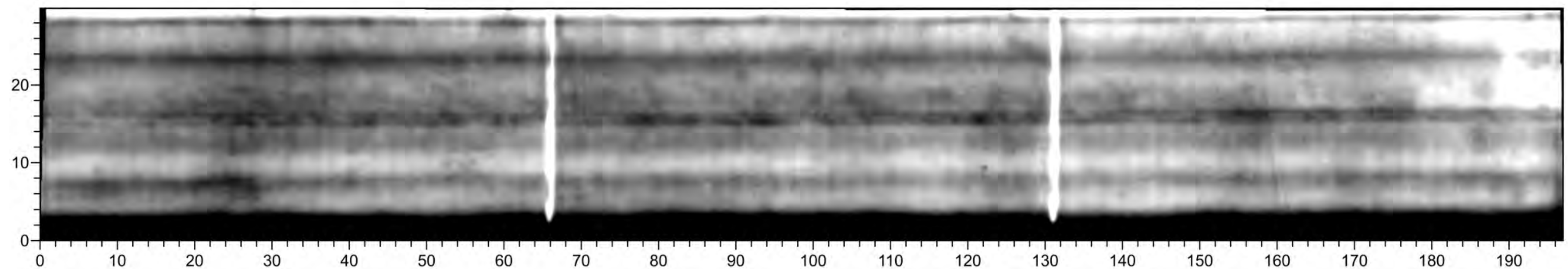
Quantity Summary	
Delamination Quantity (%)	0.6
Delamination Quantity (ft^2)	32

Analysis Information

Imagery Collected: 6/4/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/5/22

Bridge No.: 0257
BYERS CREEK
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	Chain Drag Delamination Quantity (ft^2)
0	0

Chain Drag Mapping Key

Delamination

Open Spall

Delamination With Areas of Spalling

Patching

Area of Failed Overlay

Delamination with Area of Failed Overlay

Delamination, Area of Failed Overlay, Spalling

Crack With Edge Spalling

Scale

1-in = 15-ft

0 15

Orientation

Delaminations Detected by Aerial Infrared

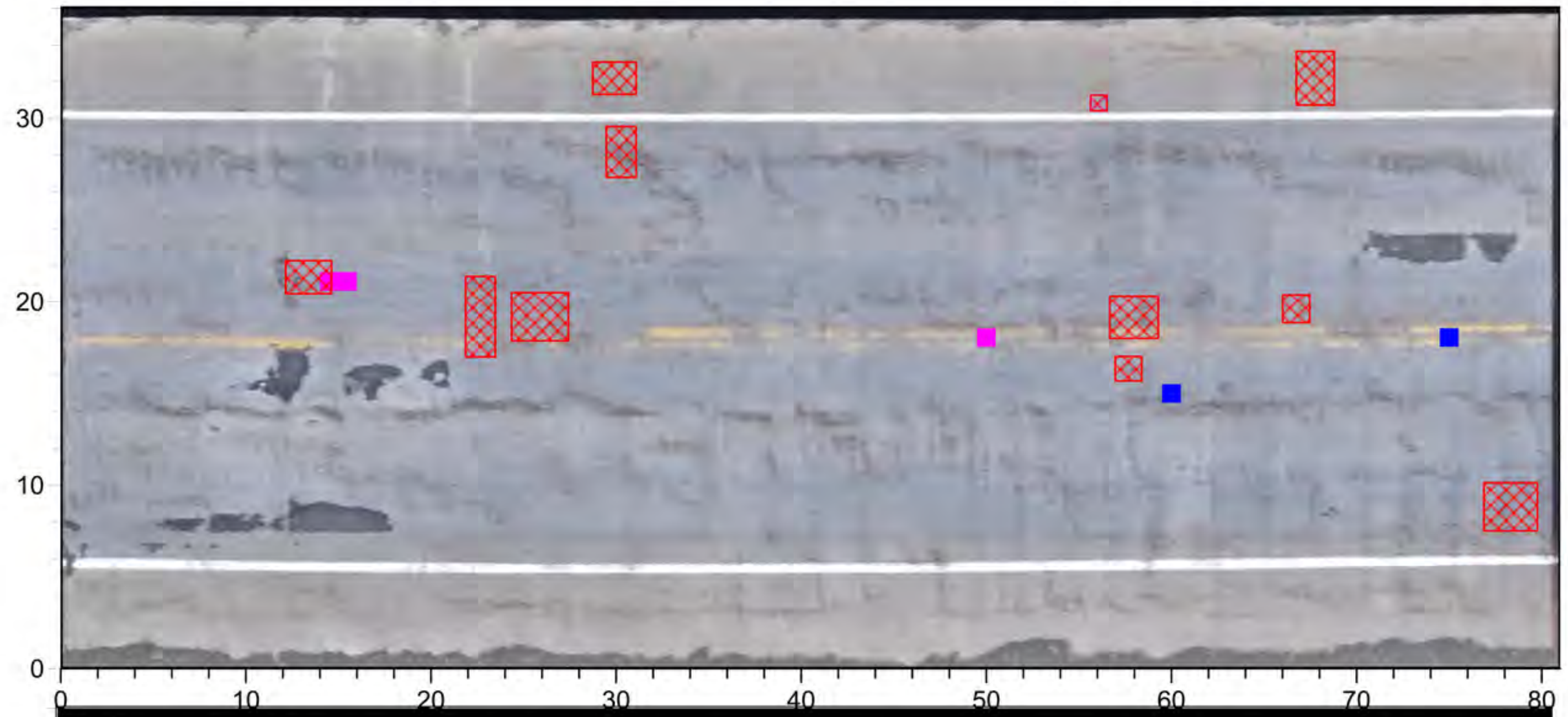
Quantity Summary

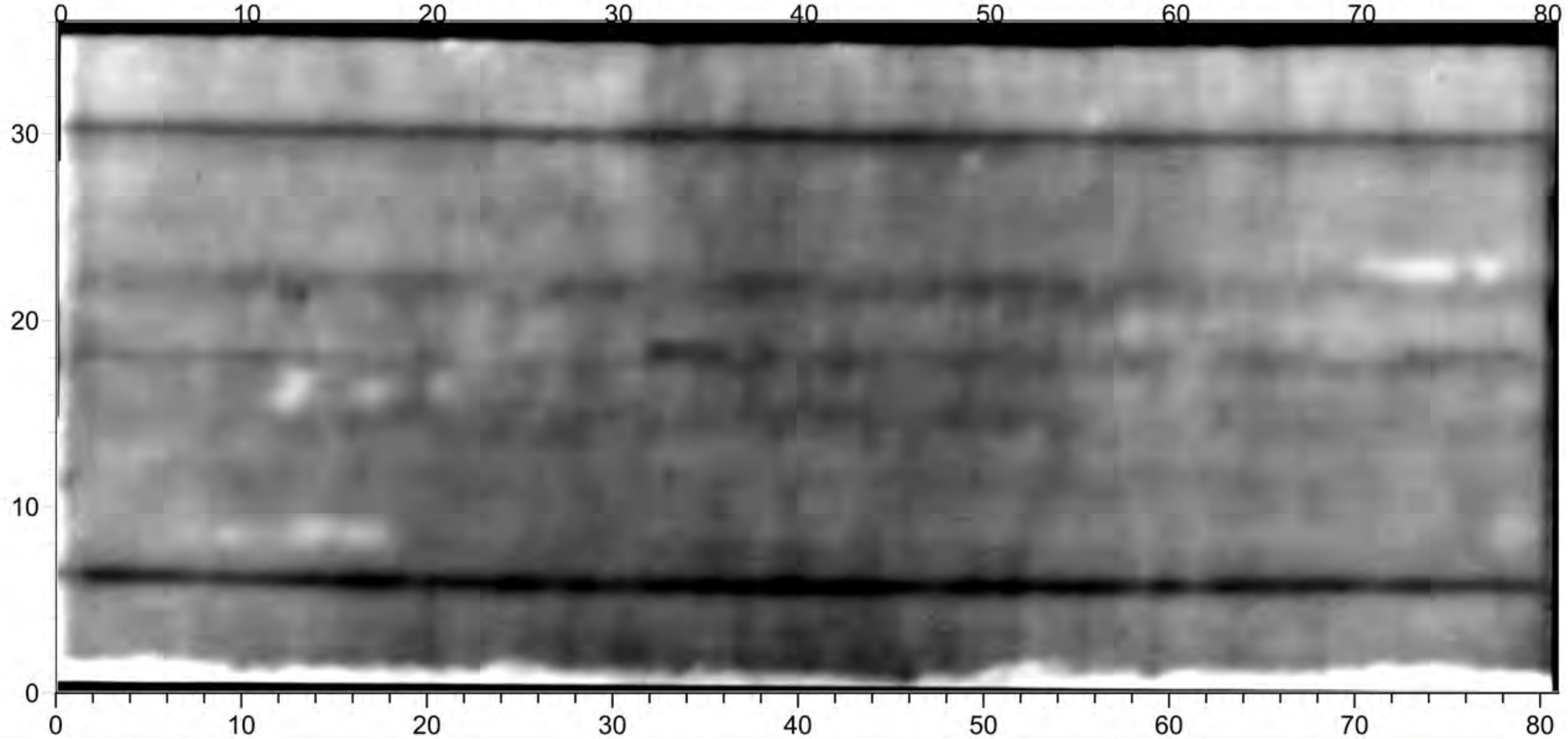
Delamination Quantity (%)	1.1
Delamination Quantity (ft^2)	65

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/6/22

Bridge No.: 0302
JACK RIVER
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	0.2
Chain Drag Delamination Quantity (ft²)	5
Chain Drag Delam/Spall Quantity (%)	0.1
Chain Drag Delam/Spall Quantity (ft²)	3

Chain Drag Mapping Key

- Delamination
- Open Spall
- Delamination With Areas of Spalling
- Patching
- Area of Failed Overlay
- Delamination with Area of Failed Overlay
- Delamination, Area of Failed Overlay, Spalling
- Crack With Edge Spalling

Scale

1-in = 10-ft

0 10

Orientation

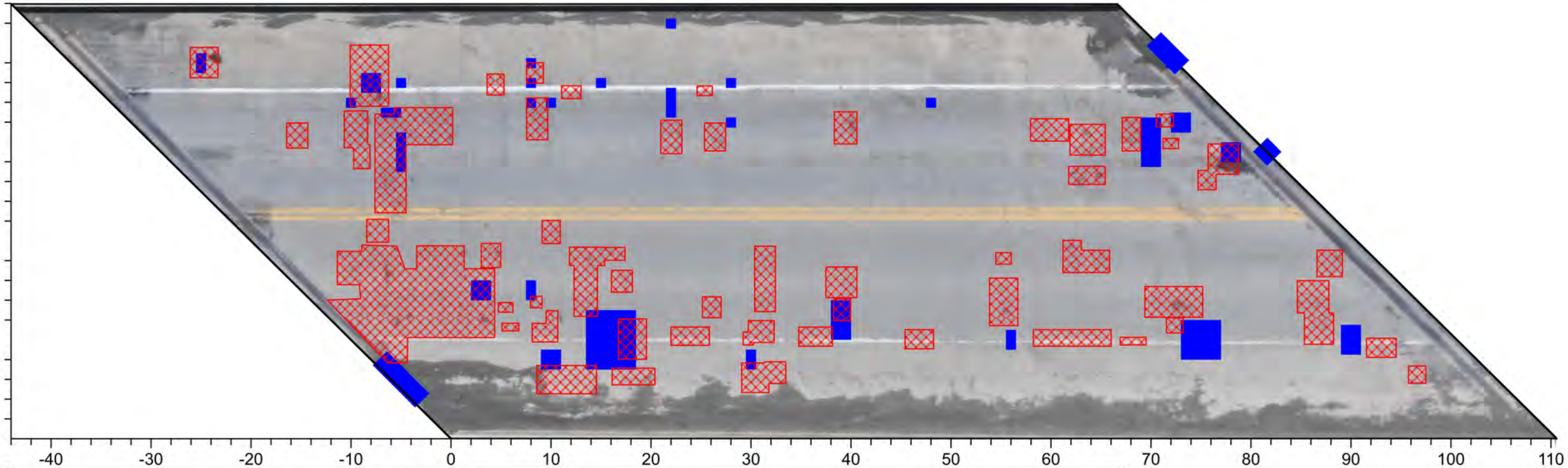
Delaminations Detected by Aerial Infrared

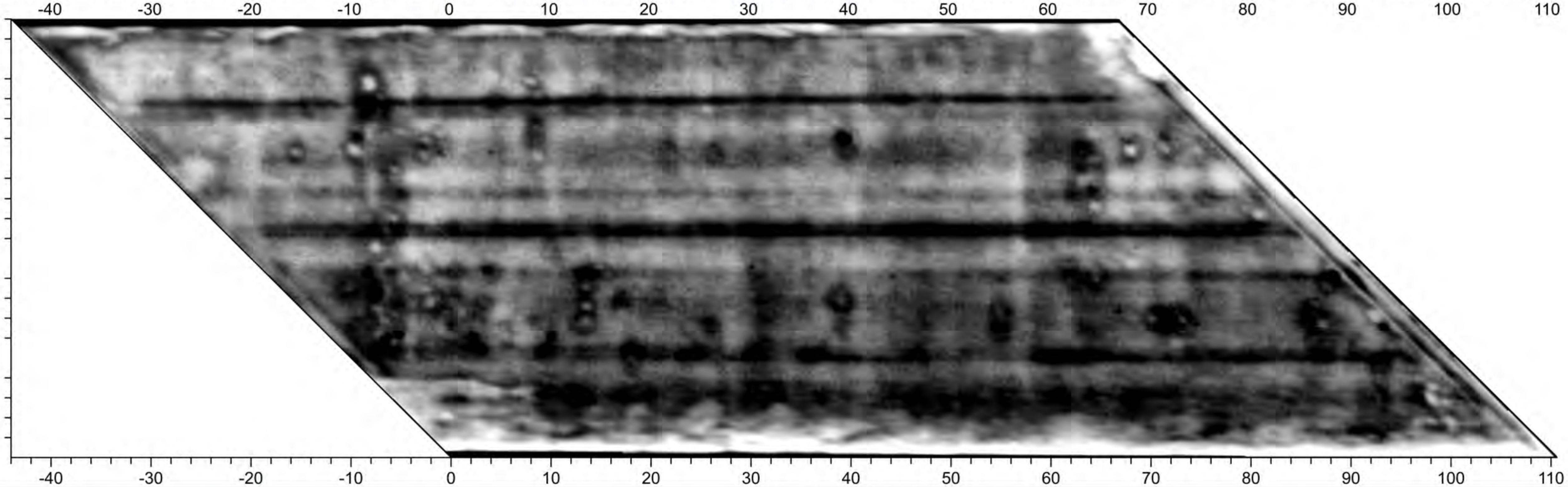
Quantity Summary	
Delamination Quantity (%)	1.8
Delamination Quantity (ft²)	52.6

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/6/22

Bridge No.: 0311
BEAR CREEK
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	3.1
Chain Drag Delamination Quantity (ft²)	153

Chain Drag Mapping Key

Delamination

Open Spall

Delamination With Areas of Spalling

Patching

Area of Failed Overlay

Delamination with Area of Failed Overlay

Delamination, Area of Failed Overlay, Spalling

Crack With Edge Spalling

Scale

1-in = 12-ft

0 12

Orientation

Delaminations Detected by Aerial Infrared

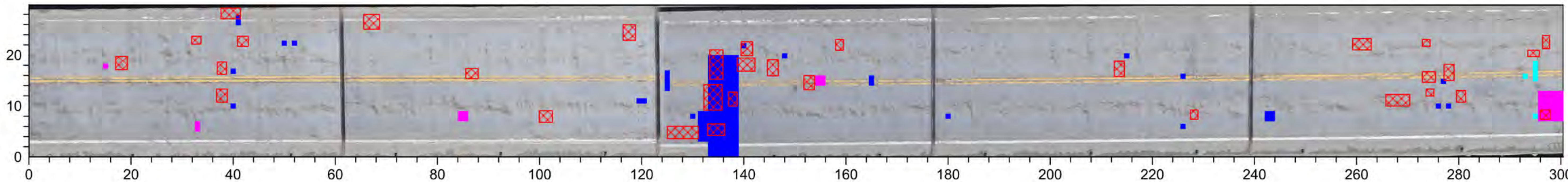
Quantity Summary

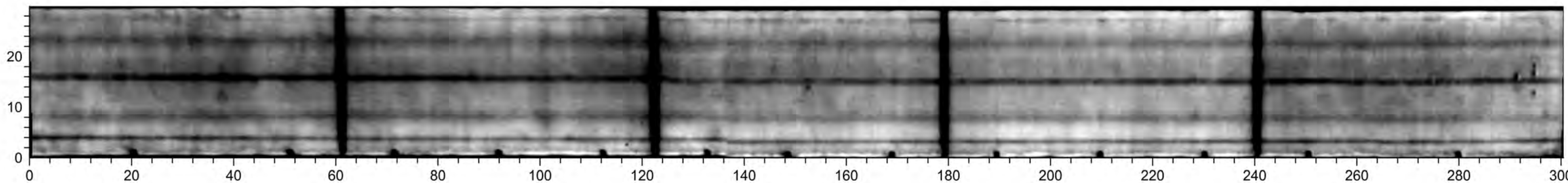
Delamination Quantity (%)	11.9
Delamination Quantity (ft^2)	578

Analysis Information

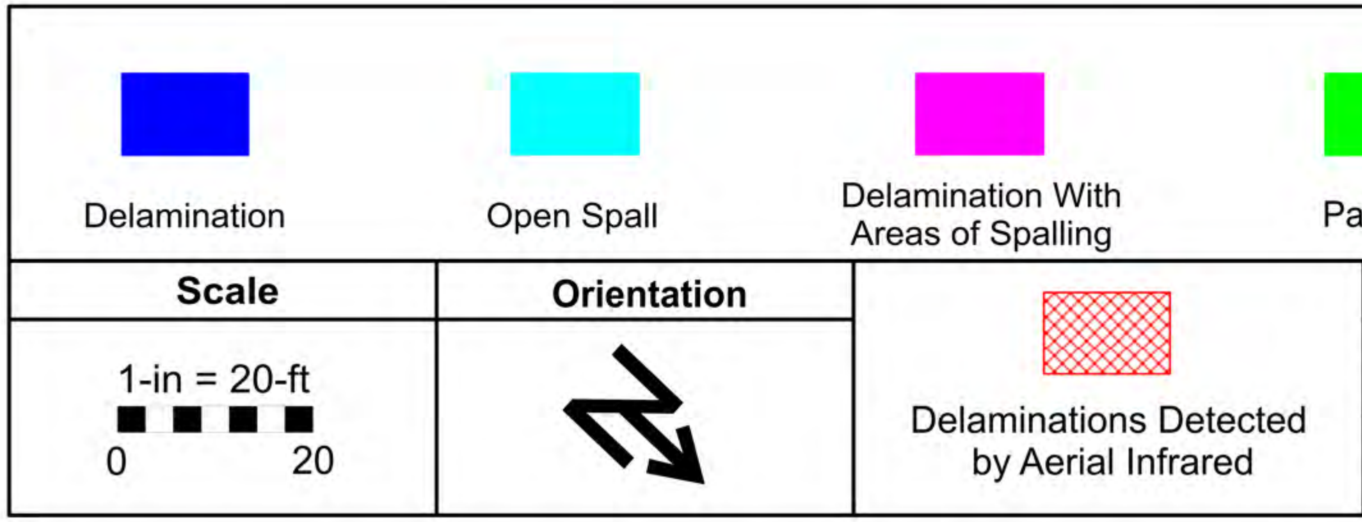
Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/9/22

Bridge No.: 0697
KINGFISHER CREEK
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	Chain Drag Delamination Quantity (ft²)	Chain Drag Spalling Quantity (%)	Chain Drag Spalling Quantity (ft²)	Chain Drag Delam/Spall Quantity (%)	Chain Drag Delam/Spall Quantity (ft²)
2.2	201	0.1	6	0.5	41



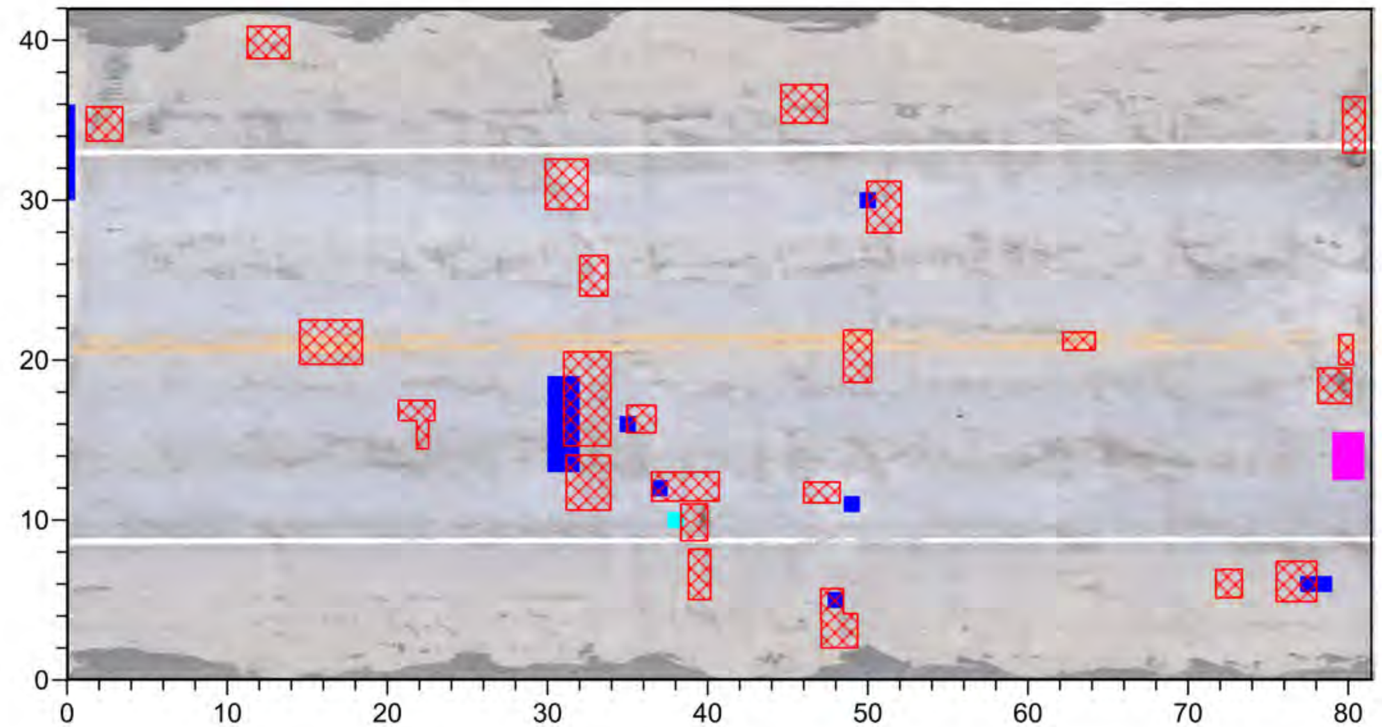
Quantity Summary

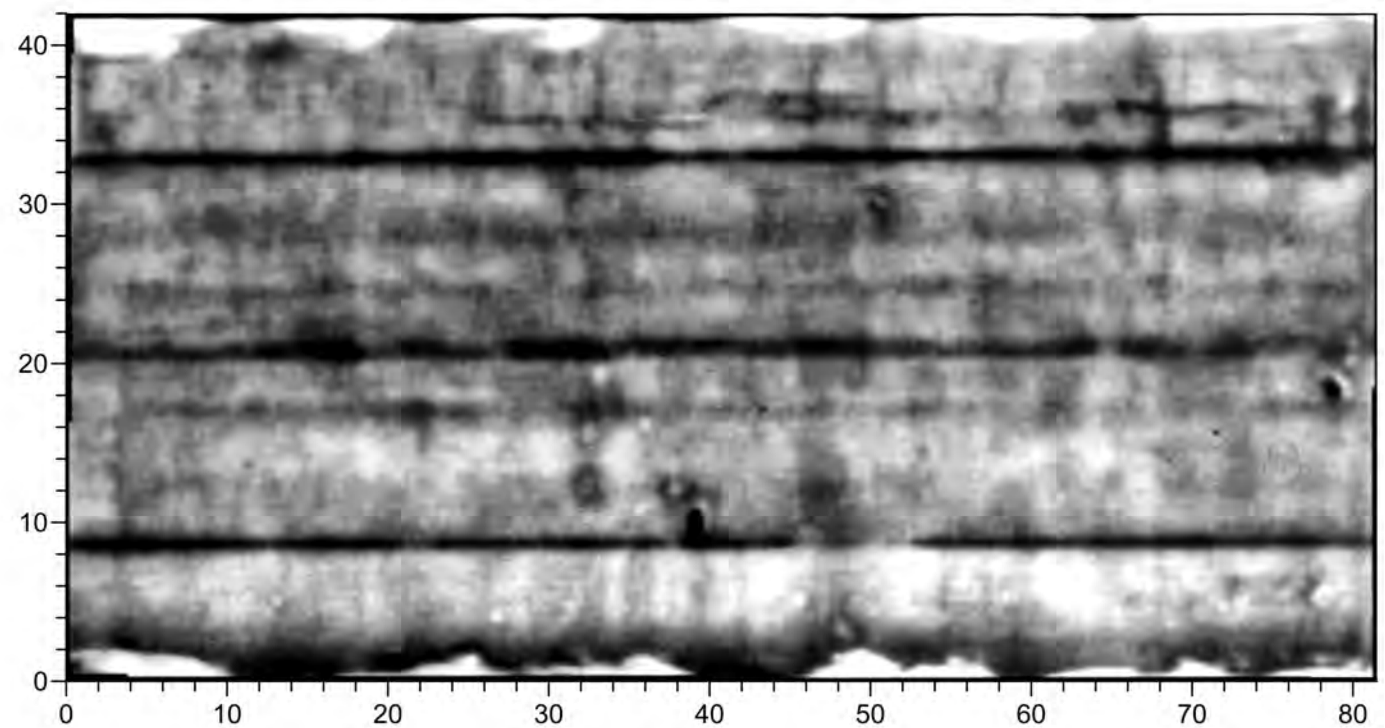
Delamination Quantity (%)	2.3
Delamination Quantity (ft²)	207

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/9/22

Bridge No.: 0851
DRY CREEK
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	0.9
Chain Drag Delamination Quantity (ft^2)	31
Chain Drag Spalling Quantity (%)	<0.1
Chain Drag Spalling Quantity (ft^2)	1
Chain Drag Delam/Spall Quantity (%)	0.2
Chain Drag Delam/Spall Quantity (ft^2)	6

Chain Drag Mapping Key

Delamination

Open Spall

Delamination With Areas of Spalling

Patching

Area of Failed Overlay

Delamination with Area of Failed Overlay

Delamination, Area of Failed Overlay, Spalling

Crack With Edge Spalling

Scale

1-in = 12-ft

0 12

Orientation

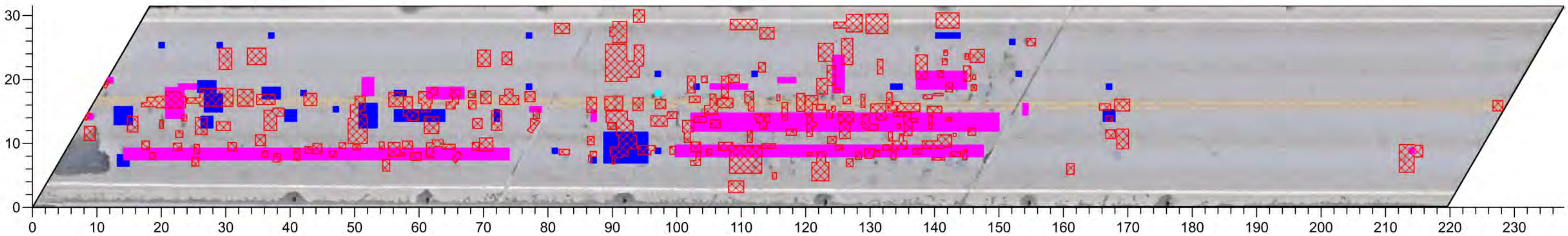
Delaminations Detected by Aerial Infrared

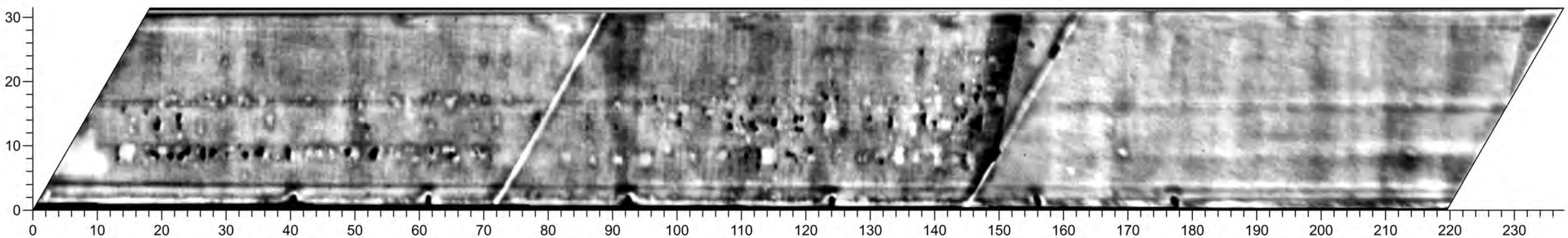
Quantity Summary	
Delamination Quantity (%)	4.0
Delamination Quantity (ft^2)	136

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/9/22

Bridge No.: 1075
DRAGONFLY CREEK
PARKS HIGHWAY



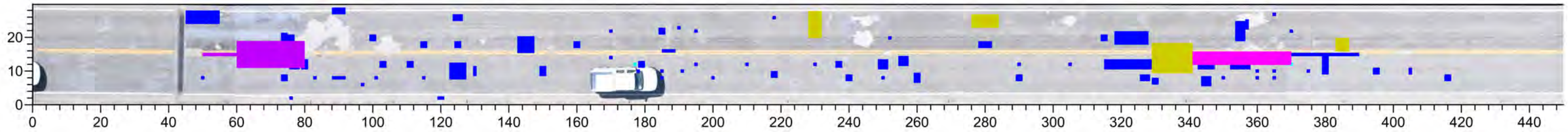


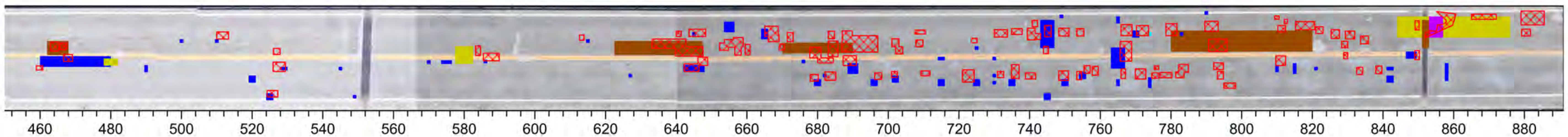
Chain Drag Delamination Quantity (%)	Chain Drag Delamination Quantity (ft²)	Chain Drag Spalling Quantity (%)	Chain Drag Spalling Quantity (ft²)	Chain Drag Delam/Spall Quantity (%)	Chain Drag Delam/Spall Quantity (ft²)
8.5	586	<0.1	1	6.5	450

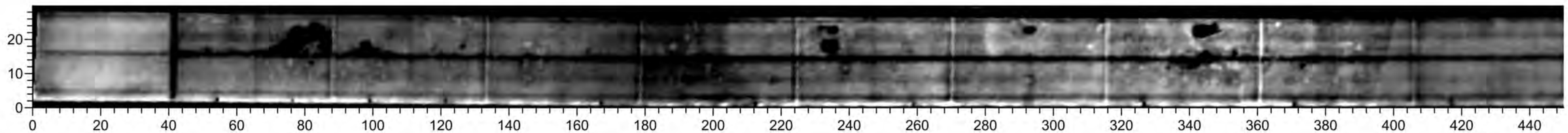
Chain Drag Mapping Key

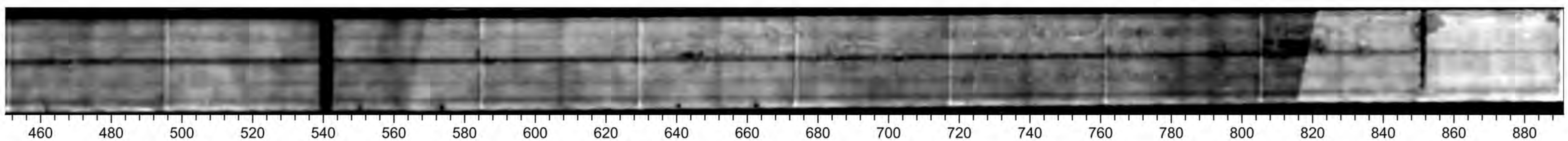
- Delamination
- Open Spall
- Delamination With Areas of Spalling
- Patching
- Area of Failed Overlay
- Delamination with Area of Failed Overlay
- Delamination, Area of Failed Overlay, Spalling
- Crack With Edge Spalling

Scale	Orientation		Quantity Summary		Analysis Information	
1-in = 20-ft 0 20		Delaminations Detected by Aerial Infrared	Delamination Quantity (%)	8.5	Imagery Collected: 6/5/22 Analyzed by: EG, SB Reviewed by: AJC Completed: 10/10/22	Bridge No.: 1141 ANTLER CREEK PARKS HIGHWAY
			Delamination Quantity (ft²)	591		









Chain Drag Delamination Quantity (%)	Chain Drag Delamination Quantity (ft²)	Chain Drag Spalling Quantity (%)	Chain Drag Spalling Quantity (ft²)	Chain Drag Delam/Spall Quantity (%)	Chain Drag Delam/Spall Quantity (ft²)	Chain Drag Failed Overlay Quantity (%)	Chain Drag Failed Overlay Quantity (ft²)	Chain Drag Delam/F. Overlay Quantity (%)	Chain Drag Delam/F. Overlay Quantity (ft²)	Chain Drag Delam/F. Overlay/ Spall Quantity (%)	Chain Drag Delam/F. Overlay/ Spall Quantity (ft²)
6.8	1811	<0.1	3	0.6	160	0.8	199	1.6	413	1.7	440

Chain Drag Mapping Key

- Delamination
- Open Spall
- Delamination With Areas of Spalling
- Patching
- Area of Failed Overlay
- Delamination with Area of Failed Overlay
- Delamination, Area of Failed Overlay, Spalling
- Crack With Edge Spalling

Scale

1-in = 30-ft

0 30

Orientation

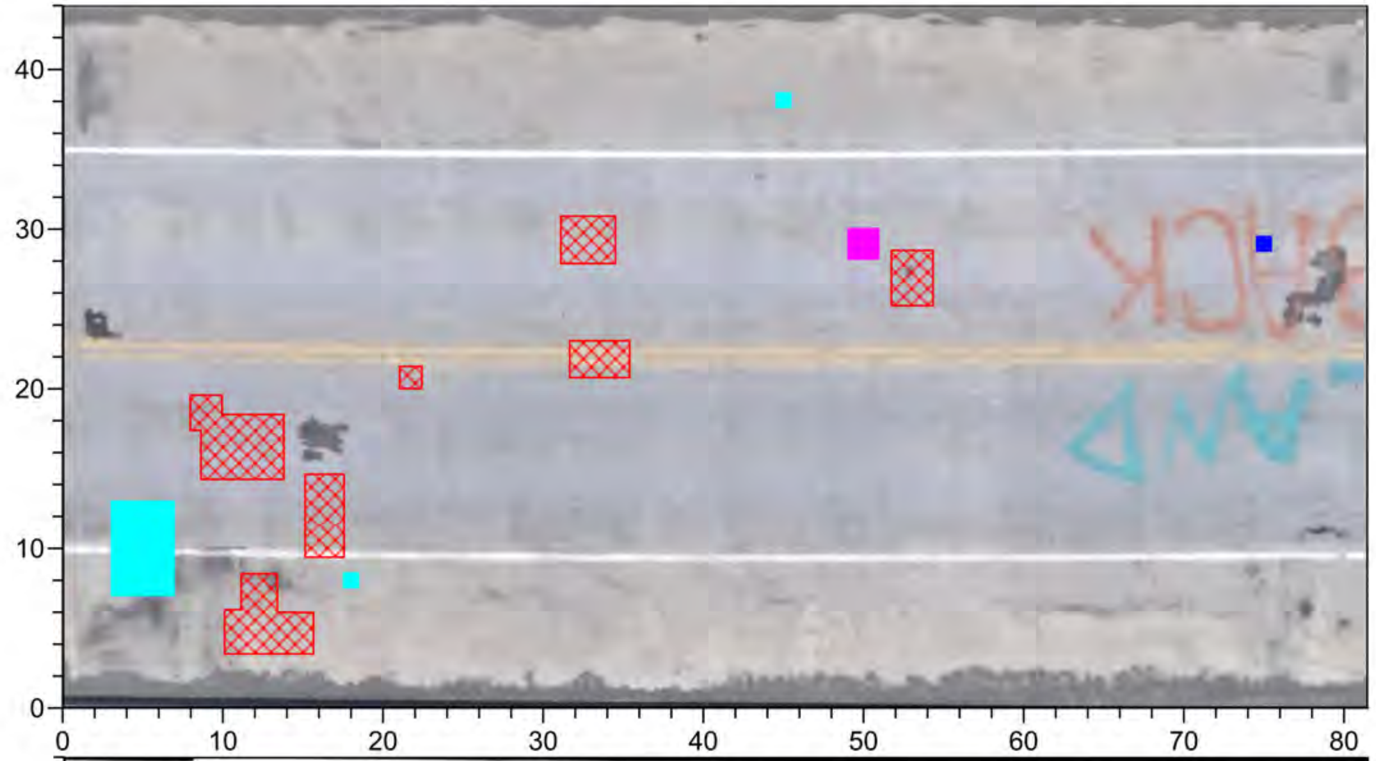
Delaminations Detected by Aerial Infrared

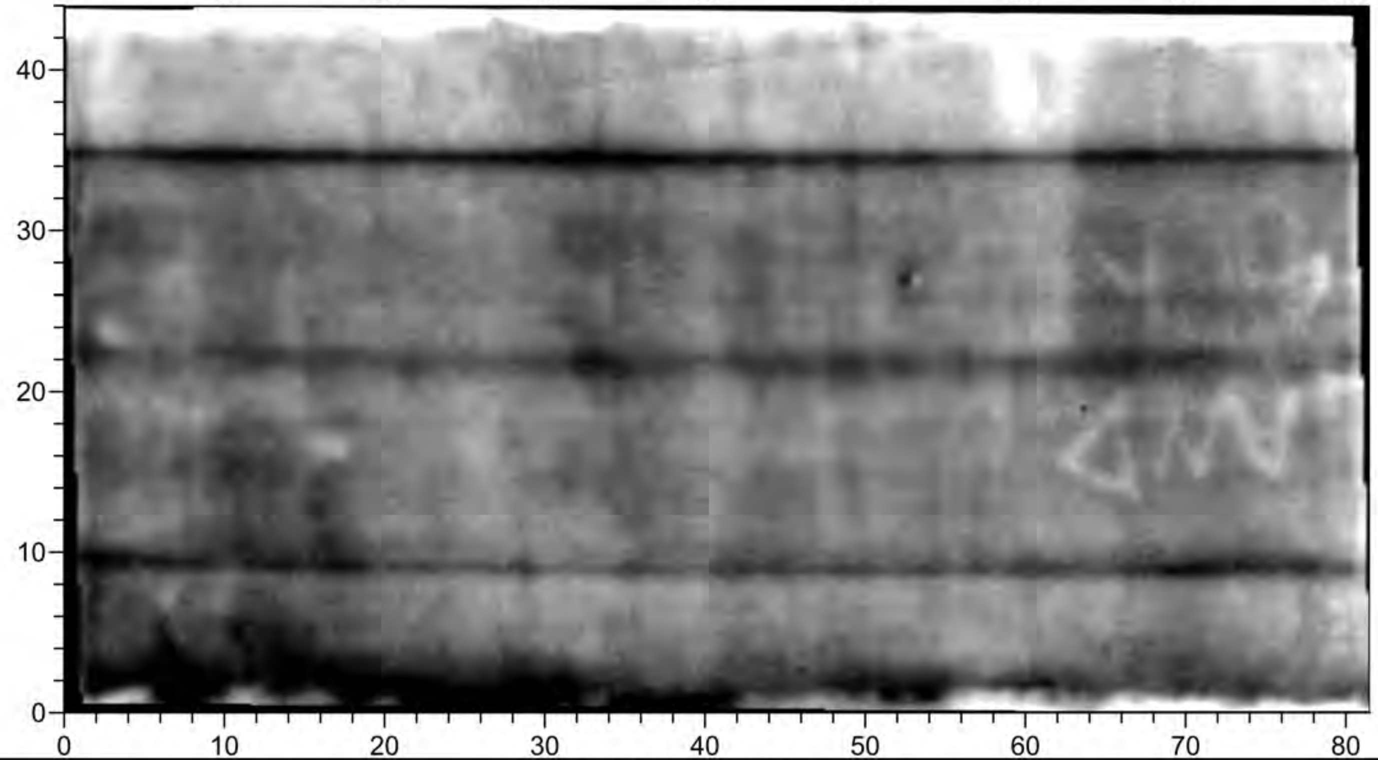
Quantity Summary	
Delamination Quantity (%)	5.8
Delamination Quantity (ft^2)	1546

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/10/22

Bridge No.: 1143
NENANA RIVER AT MOODY
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	0.1
Chain Drag Delamination Quantity (ft²)	5
Chain Drag Spalling Quantity (%)	0.7
Chain Drag Spalling Quantity (ft²)	26
Chain Drag Delam/Spall Quantity (%)	0.1
Chain Drag Delam/Spall Quantity (ft²)	4

Chain Drag Mapping Key

Delamination | Open Spall | Delamination With Areas of Spalling | Patching | Area of Failed Overlay | Delamination with Area of Failed Overlay | Delamination, Area of Failed Overlay, Spalling | Crack With Edge Spalling

Scale

1-in = 12-ft

0 12

Orientation

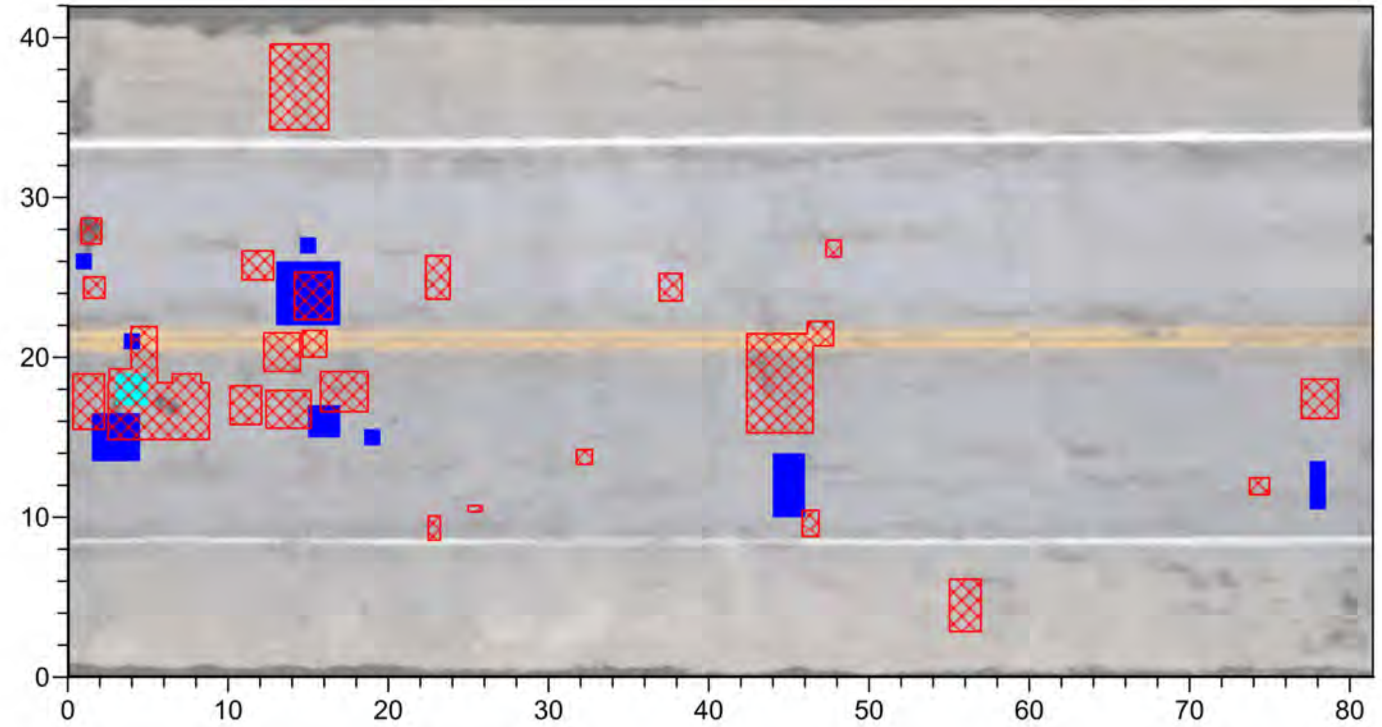
Delaminations Detected by Aerial Infrared

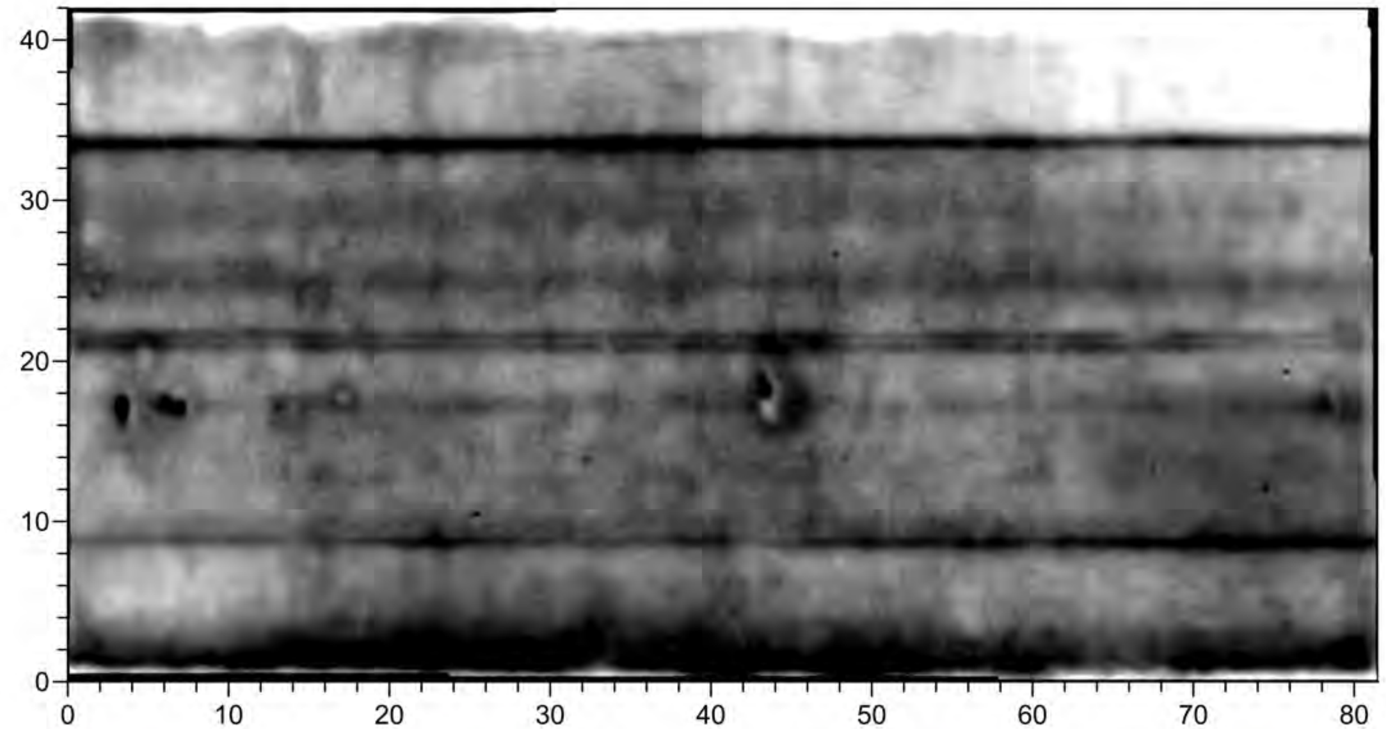
Quantity Summary	
Delamination Quantity (%)	2.4
Delamination Quantity (ft²)	87

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/10/22

Bridge No.: 1144
FOX CREEK
PARKS HIGHWAY





Chain Drag Delamination Quantity (%)	1.3
Chain Drag Delamination Quantity (ft²)	44
Chain Drag Spalling Quantity (%)	0.1
Chain Drag Spalling Quantity (ft²)	4

Chain Drag Mapping Key

- Delamination
- Open Spall
- Delamination With Areas of Spalling
- Patching
- Area of Failed Overlay
- Delamination with Area of Failed Overlay
- Delamination, Area of Failed Overlay, Spalling
- Crack With Edge Spalling

Scale

1-in = 12-ft

0 12

Orientation

Delaminations Detected by Aerial Infrared

Quantity Summary

Delamination Quantity (%)	4.4
Delamination Quantity (ft^2)	151

Analysis Information

Imagery Collected: 6/5/22
Analyzed by: EG, SB
Reviewed by: AJC
Completed: 10/10/22

Bridge No.: 1146
ICEWORM GULCH
PARKS HIGHWAY