MARTIN/MARTIN
CONSULTING ENGINEERS

CU Anschutz Parking Lot Repairs (23-01226)

CU Anschutz Medical Campus
Aurora, Colorado

Martin/Martin, Inc. Project No.: 22.1635

February 10, 2023

Revised March 24, 2023

Prepared For:	Mr. David Perkins University of Colorado Denver | Anschutz Medical Campus 1945 Wheeling Street Aurora, Colorado 80045
Prepared By:	MARTIN/MARTIN, INC. 12499 WEST COLFAX AVENUE LAKEWOOD, COLORADO 80215 303.431.6100

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MARTIN/MARTIN
CONSULTING ENGINEERS

I. INTRODUCTION

A. Scope

Martin/Martin, Inc. [M/M] entered into an agreement with The University of Colorado Denver Anschutz Medical Campus [University] on December 1, 2022, to provide evaluation and improvement recommendations of seven parking lots on the Anschutz Medical Campus. These lots include Aspen, Purgatory, Breckenridge, Frisco, Evergreen, Durango, and Leadville. The existing lots show varying degrees of degradation from age and use. This report outlines the condition of each, recommended improvements to extend the service life based on observed conditions and University communicated priorities/budget, and the estimated costs for the suggested improvements. Technical specifications for the suggested improvements are not included within this report but are included in the separate bidding documents.

II. EXISTING CONDITIONS

M/M performed three site visits on November 22, 2022, November 23, 2022, and December 4, 2022 to observe the existing conditions of each parking lot. Copies of the field notes are included within this report as Exhibit A. Observations for each lot are outlined below and typical photos to demonstrate existing conditions (longitudinal cracking, alligator cracking, raveling, concrete pan/curb/gutter deterioration, settlement of previous patching, drainage issues, etc.) are included within this report as Exhibit B.

A. Aspen Lot

This lot has significant large longitudinal cracking throughout that is greater than 1” in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the large cracking. For smaller cracks than 1” in width, a hot applied joint sealant is recommended. Previous areas have been patched in the lot and appear to still be in good condition, with a joint sealant recommended around the patched areas. Lastly, a few concrete areas near the northwest entrance of the lot were observed to be deteriorated and are recommended to be removed/replaced (gutter pan and curb/gutter).

B. Breckenridge Lot

This lot has significant large longitudinal cracking throughout that is greater than 1” in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the cracking. For smaller cracks than 1” in width, a hot applied joint sealant is recommended.

C. Durango Lot

This lot has some large longitudinal cracking throughout that is greater than 1” in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the large cracking. For smaller cracks than 1” in width, a hot applied

joint sealant is recommended. Previous areas have been patched in the lot and appear to still be in good condition, with a joint sealant recommended around the patched areas.

D. Evergreen Lot

This lot has some large longitudinal cracking throughout that is greater than 1" in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the large cracking. For smaller cracks than 1" in width, a hot applied joint sealant is recommended. There are also some areas of large alligator cracking present that are recommended to be removed/replaced to address the apparent poor subgrade conditions. Also, a concrete vault area in the middle of the lot was observed to be deteriorated and is recommended for the top section to be removed/replaced. Lastly, there were some areas of poor drainage observed on the south side of the lot. To address these, it would first be recommended to explore further with a topographic survey to better understand the elevations and drainage patterns of the lot.

E. Frisco Lot

This lot has significant large longitudinal cracking throughout that is greater than 1" in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the large cracking. For smaller cracks than 1" in width, a hot applied joint sealant is recommended. Lastly, a few concrete areas near the southwest and northeast sections of the lot were observed to be deteriorated and are recommended to be removed/replaced (gutter pan and curb/gutter).

F. Leadville Lot

This lot has some large longitudinal cracking throughout that is greater than 1" in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the large cracking. For smaller cracks than 1" in width, a hot applied joint sealant is recommended. There are also some areas of large alligator cracking and raveling present that are recommended to be removed/replaced to address the apparent poor subgrade conditions. Lastly, a few concrete areas throughout the lot were observed to be deteriorated and are recommended to be removed/replaced (gutter pan and curb/gutter).

G. Purgatory Lot

This lot has significant large longitudinal cracking throughout that is greater than 1" in width. For these areas, it is recommended to remove/replace the asphalt to full depth and fix any subgrade issues that may have contributed to the large cracking. For smaller cracks than 1" in width, a hot applied joint sealant is recommended. Previous areas have been patched in the lot and appear to still be in good condition, with a joint sealant recommended around the patched areas. There are also some areas of large alligator cracking present that are recommended to be removed/replaced to address the apparent poor subgrade conditions.

III. RECOMMENDED IMPROVEMENTS

Following site visits to observe the existing conditions and consultation with the University to realize their campus priorities and available budget, M/M has created a set of recommended improvements to extend the service life of each lot. Those improvements include asphalt crack sealing, asphalt slurry seal, asphalt full-depth removal/replacement, asphalt milling/overlay, and pavement markings. Previously, repairs to existing concrete infrastructure (drainage pan, curb, gutter) were recommended but the University wishes to evaluate those repairs on an as needed basis and within the budget allowed with the awarded contractor. Further details of each recommended improvement are included below. In addition, a summary of estimated quantities and a layout depicting each improvement location are included as Exhibits C & D.

A. Asphalt Crack Sealing

Asphalt crack sealing is intended for areas where the cracking is less than 1-inch wide and is to be measured per lineal foot. The cracks would be cleaned out with compressed air and a hot-applied joint sealant would fill in the crack to be flush with the surface of the existing pavement. These locations are to be outside of the limits that are to be repaired under the Asphalt Full-Depth Repair item or Asphalt Mill/Overlay items.

B. Asphalt Slurry Seal

Asphalt slurry seal is intended to be applied to the asphalt surface of an entire lot following all other improvements (crack sealing, asphalt remove/replace, etc.) and is to be measured per square foot.

C. Asphalt Full-Depth Repair (Remove/Replace)

Asphalt full-depth remove/replace repair is intended for cracking larger than 1-inch wide and areas of poor subsurface condition (as realized by asphalt alligator cracking) and is to be measured per square foot as indicated on the plan sheets. Each area is to be sawcut to a vertical line and a tack coat applied prior to asphalt placement. Each area is to be excavated to sound base course material, allowing for import of material (Class 6 Aggregate Base) if necessary, and compacted to provide a solid subgrade base for asphalt. Asphalt to be placed and compacted while still hot to match the surrounding adjacent surface grades and elevations.

D. Asphalt Milling

For the Purgatory and Breckenridge lots, asphalt milling/overlay is intended for the entire surface of each lot, measured by the square foot. The entire surface would be milled to a depth of 2” and to a surface free of gouges, grooves, and ridges. This would include disposal of milled asphaltic material from the project site and the surface would be cleaned to be free of loose material and dust prior to the asphalt overlay.

E. Asphalt Concrete Pavement, 2” Overlay

For the Purgatory and Breckenridge lots, asphalt milling/overlay is intended for the entire surface of each lot, measured by the square foot. New asphalt concrete pavement is to be placed in all areas where the existing surface was milled. The final surface shall match the lines, grades, and elevations prior to milling. The final surface shall also maintain all existing drainage. A tack coat is to be applied between the milled surface and the new pavement, and testing/compaction of the asphalt mix to be included under this item.

F. Concrete Drainage Pan, Curb, and/or Gutter (Remove/Replace)

Concrete remove/replace is intended for areas where the existing concrete surface (vault lid, gutter pan, curb/gutter) has deteriorated and is to be measured by the square foot. This item includes removal of the old concrete. Each area is to be sawcut to a vertical line and be excavated to sound base course material, allowing for import of material (Class 6 Aggregate Base) if necessary, and compacted to provide a solid subgrade base for concrete. Reinforcing steel and joint sealants are also be included under this item. The final surface, lines, grades, elevations and horizontal placement prior to construction must be surveyed and existing drainage patterns maintained. As mentioned above, the shown areas are to be suggested, but each location will have to be evaluated on as needed basis depending upon the budget allowable to the awarded contractor for the rest of the improvements.

G. Pavement Markings (High Build Acrylic)

Pavement markings are to be reapplied once all other improvements have been made to each lot and are to measured as a lump sum item. The markings shall be in the same location as the existing markings prior to the improvements.

H. Project Phasing

M/M met with the University on February 21, 2023 to review the initial draft of this report dated February 10, 2023. Following that overview and the University's internal review, the University provided their phasing priorities on February 27, 2023, which are outlined below:

1. Phase I – Immediate Priorities that may be funded right away [Exhibit C]

    - Aspen Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas and intermediate crack sealing, followed by Asphalt Slurry Seal of the entire lot with new pavement markings.
    - Durango Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas and intermediate crack sealing, followed by Asphalt Slurry Seal of the entire lot with new pavement markings.
    - Frisco Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas and intermediate crack sealing, followed by Asphalt Slurry Seal of the entire lot with new pavement markings.
    - Leadville Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas and intermediate crack sealing, followed by Asphalt Slurry Seal of the entire lot with new pavement markings.

2. Phase II – Secondary Priorities that may be funded later in 2023 [Exhibit D]

    - Purgatory Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas, followed by Asphalt Milling/2" Overlay of the entire lot with new pavement markings.
    - Breckenridge Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas, followed by Asphalt Milling/2" Overlay of the entire lot with new pavement markings.
    - Evergreen Lot: Asphalt Full-Depth Repair (Remove/Replace) of the recommended areas and intermediate crack sealing, followed by Asphalt Slurry Seal of the entire lot with new pavement markings.

IV. ENGINEER'S OPINION OF ESTIMATED COST

Following identification of recommended improvements and consultation with the University, M/M has created an estimated cost for each of the phases mentioned in Section III above. A breakout of these estimated costs are included as Exhibits E & F. Any opinions of probable Project costs or construction costs rendered by M/M represent its reasonable professional engineering opinion and are furnished for general guidance. M/M makes no representation, warranty, or guarantee, either expressed or implied, as to the accuracy of such opinions as compared to bid or actual costs.

EXHIBIT A – EXISTING CONDITONS (FIELD NOTES)

Aspen Lot
22,560 SY

Google Earth

100 ft

N

Breckenridge Lot

7,220 SY

Google Earth

N

100 ft

Durango Lot
5,530 SY

E 19th Dr

Uvalda Court

25'

30'

57'

135'

Google Earth

100 ft

N

Evergreen Lot

12,090 SY

Frisco Lot
12,070 SY

Frisco Parking Lot (Staff Only)

Google Earth

100 ft

N

Leadville Lot

11,030 SY

CRACK SEAL FILLING CRACKS IN DRIVEWAY

FOR TRAVELED AREAS MAY NEED TO LOOK AT POTHOLE TO VERIFY DEPTH OF ASPHALT FOR MILL & FULL DEPTH VS.

REPAIR CONC CHIP

RAISE SURFACE PATCH OF MUD

4' WIDTH

TRENCH DRAIN FOR STANDING WATER

E 19th Dr

Google Earth

N

100 ft

Purgatory Lot

4,690 SY

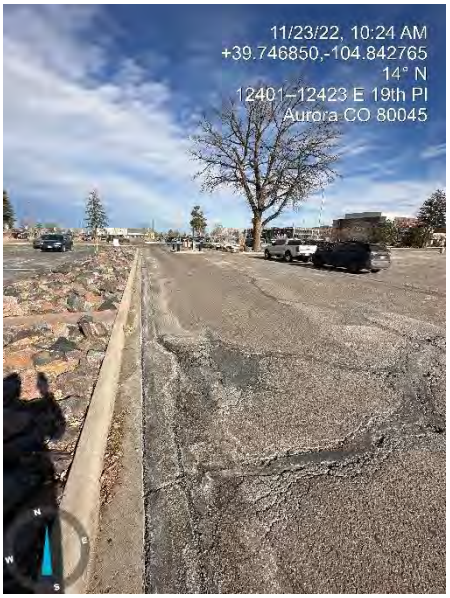
Google Earth

90 ft

N

EXHIBIT B – TYPICAL PHOTOS OF EXISTING CONDITIONS

ASPEN LOT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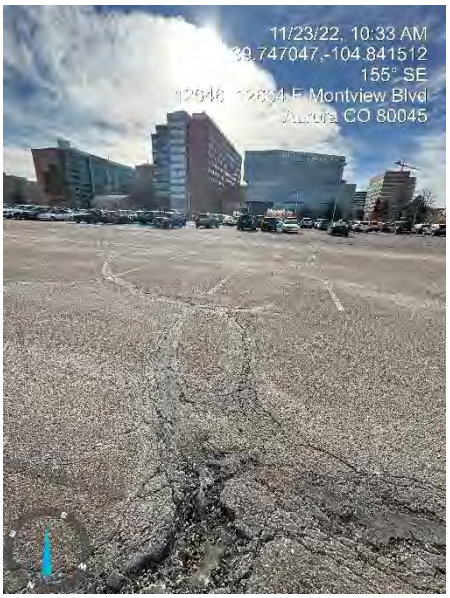
+39.746850,-104.842765
14° N
12401–12423 E 19th Pl
Aurora CO 80045


11/23/22, 10:24 AM
+39.746995,-104.842661
195° S
12600–12604 E Montview Blvd
Aurora CO 80045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12646–12664 E Montview Blvd
Aurora CO 80045


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80° E
12646–12664 E Montview Blvd
Aurora CO 80045


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327° NW
12441–12465 E 19th Pl
Aurora CO 80045


11/23/22, 11:26 AM
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116° SE
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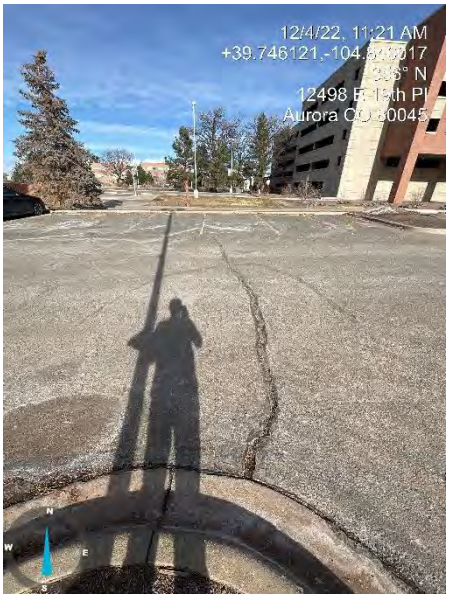
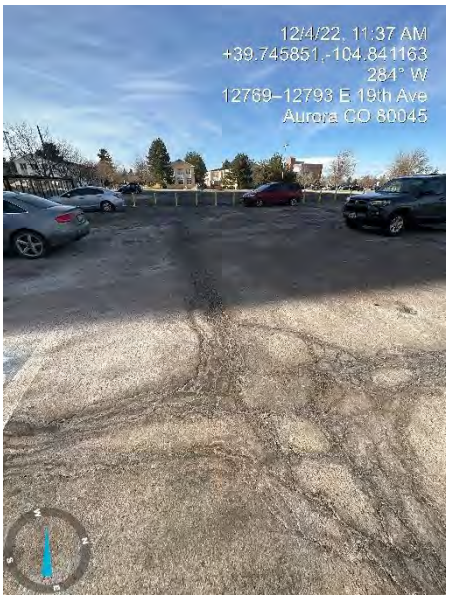
Aurora CO 80045

BRECKENRIDGE LOT





DURANGO LOT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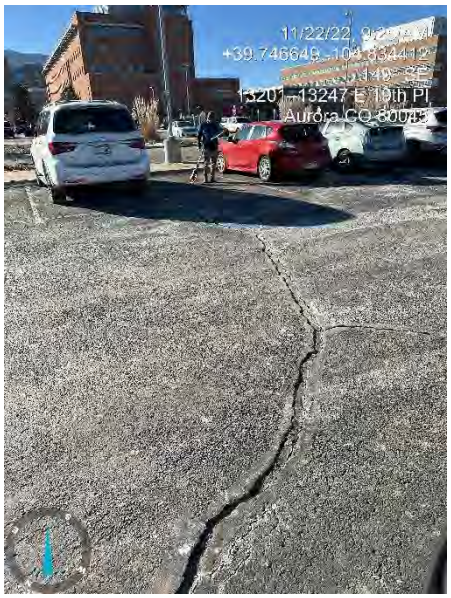
+39.746480,-104.833901
Aurora CO 80045


11/22/22, 8:49 AM
+39.746578,-104.833643
33° NE
13249–13279 E 19th Pl
Aurora CO 80045


11/22/22, 8:49 AM
+39.746633,-104.833532
161° S
13249–13279 E 19th Pl
Aurora CO 80045


11/22/22, 9:11 AM
+39.746748,-104.834097
180° S
13201–13247 E 19th Pl
Aurora CO 80045


11/22/22, 9:29 AM
13201–13247 E 19th Pl
Aurora CO 80045


11/22/22, 9:29 AM
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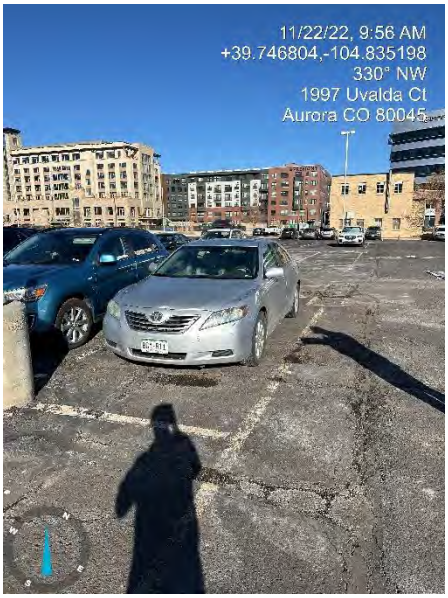
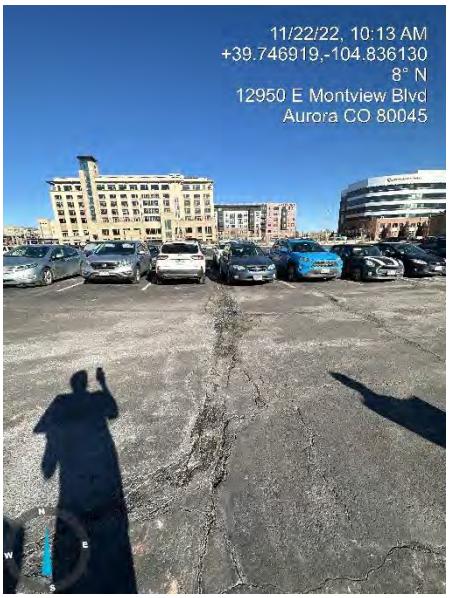
281° W
13201–13247 E 19th Pl
Aurora CO 80045

EVERGREEN LOT

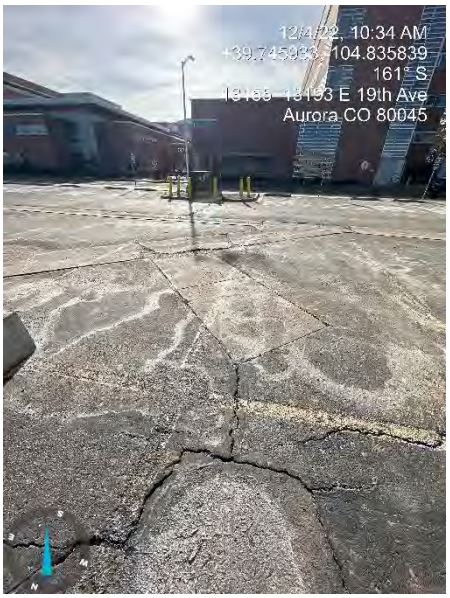




FRISCO LOT


12/4/22, 10:20 AM
+39.746058,-104.836410
83° E
13119–13135 E 19th Ave
Aurora CO 80045


12/4/22, 10:23 AM
+39.746034,-104.835715
178° S
13155–13193 E 19th Ave
Aurora CO 80045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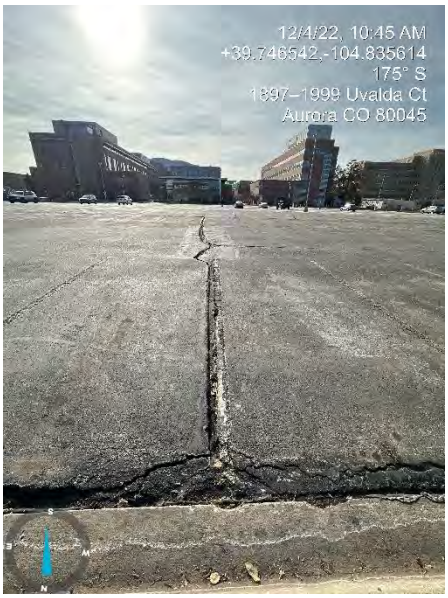
Aurora CO 80045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175° S
1897–1999 Uvalda Ct
Aurora CO 80045


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171° S
1897–1999 Uvalda Ct
Aurora CO 80045


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187° S
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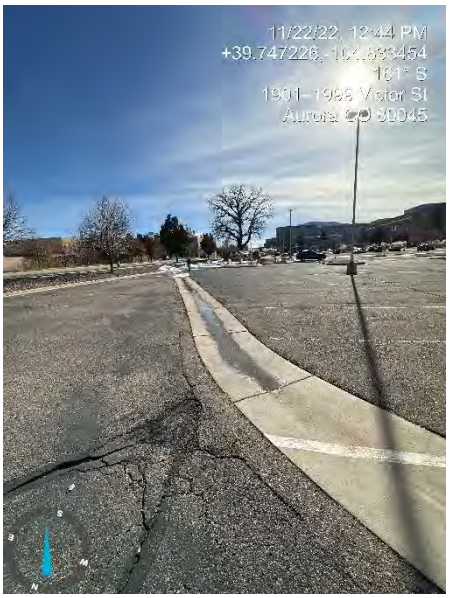
Aurora CO 80045

LEADVILLE LOT



PURGATORY LOT

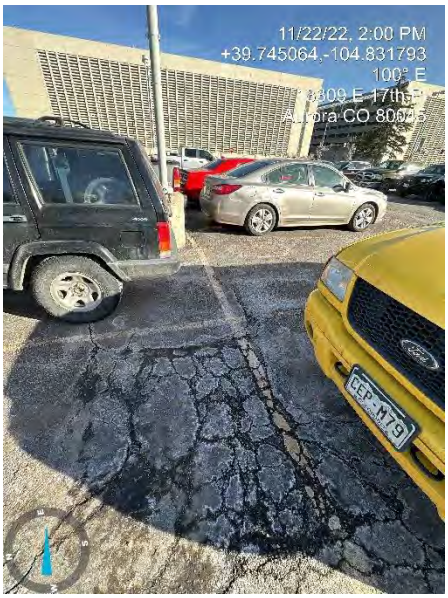


EXHIBIT C – SUGGESTED IMPROVEMENTS FOR PHASE I

MARTIN/MARTIN CONSULTING ENGINEERS

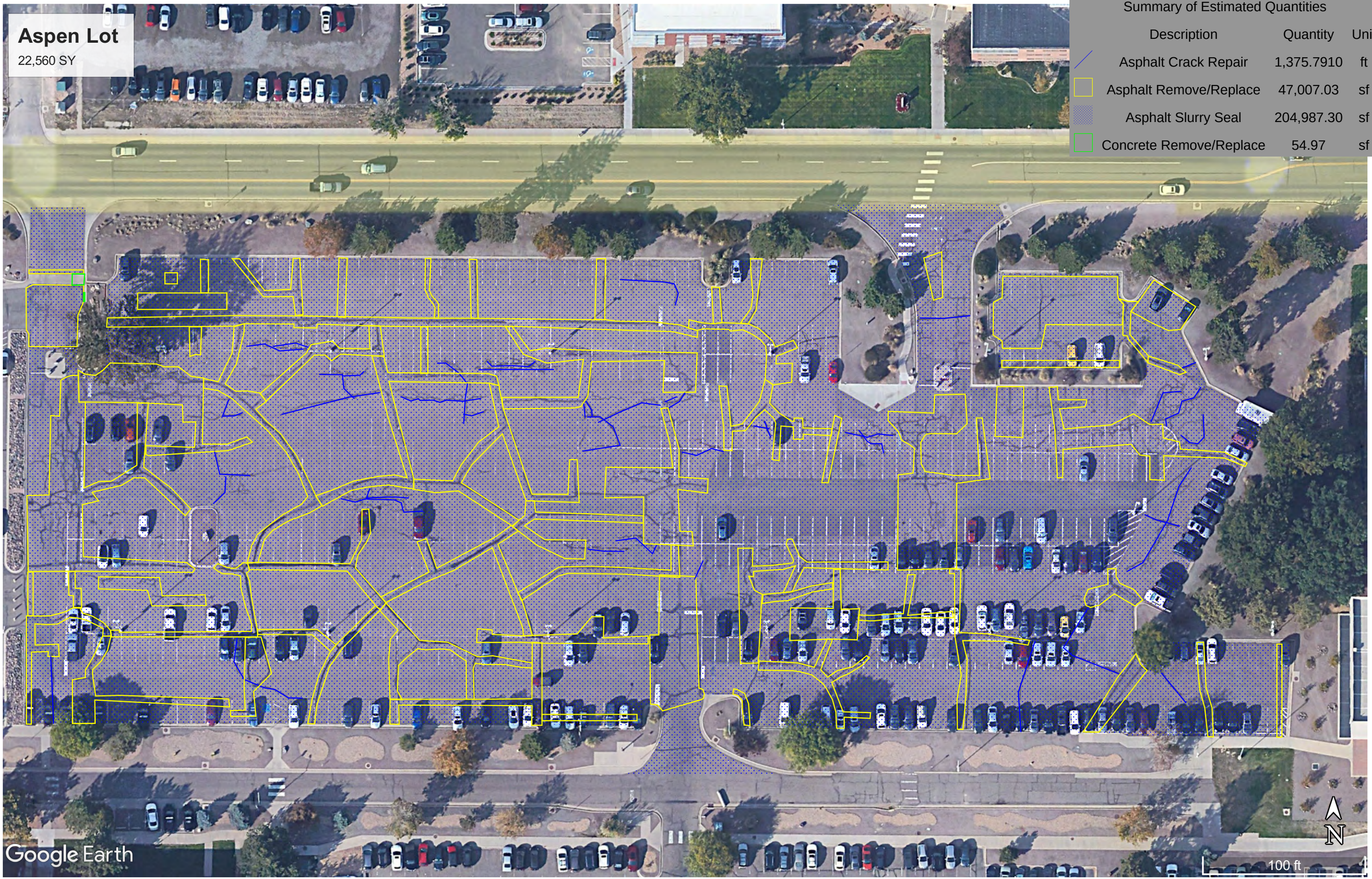
	SUMMARY OF ESTIMATED QUANTITIES			
	Asphalt Crack Repair [LF]	Asphalt Full-Depth Remove/ Replace [SF]	Asphalt Slurry Seal [SF]	Pavement Markings (High Build Acrylic) [LS]
Aspen Lot	1,376	47,007	204,987	1
Durango Lot	729	12,350	47,804	1
Frisco Lot	245	15,322	109,878	1
Leadville Lot	1,683	17,335	94,048	1
Totals	**4,033**	**92,014**	**456,717**	

Aspen Lot

22,560 SY

Summary of Estimated Quantities

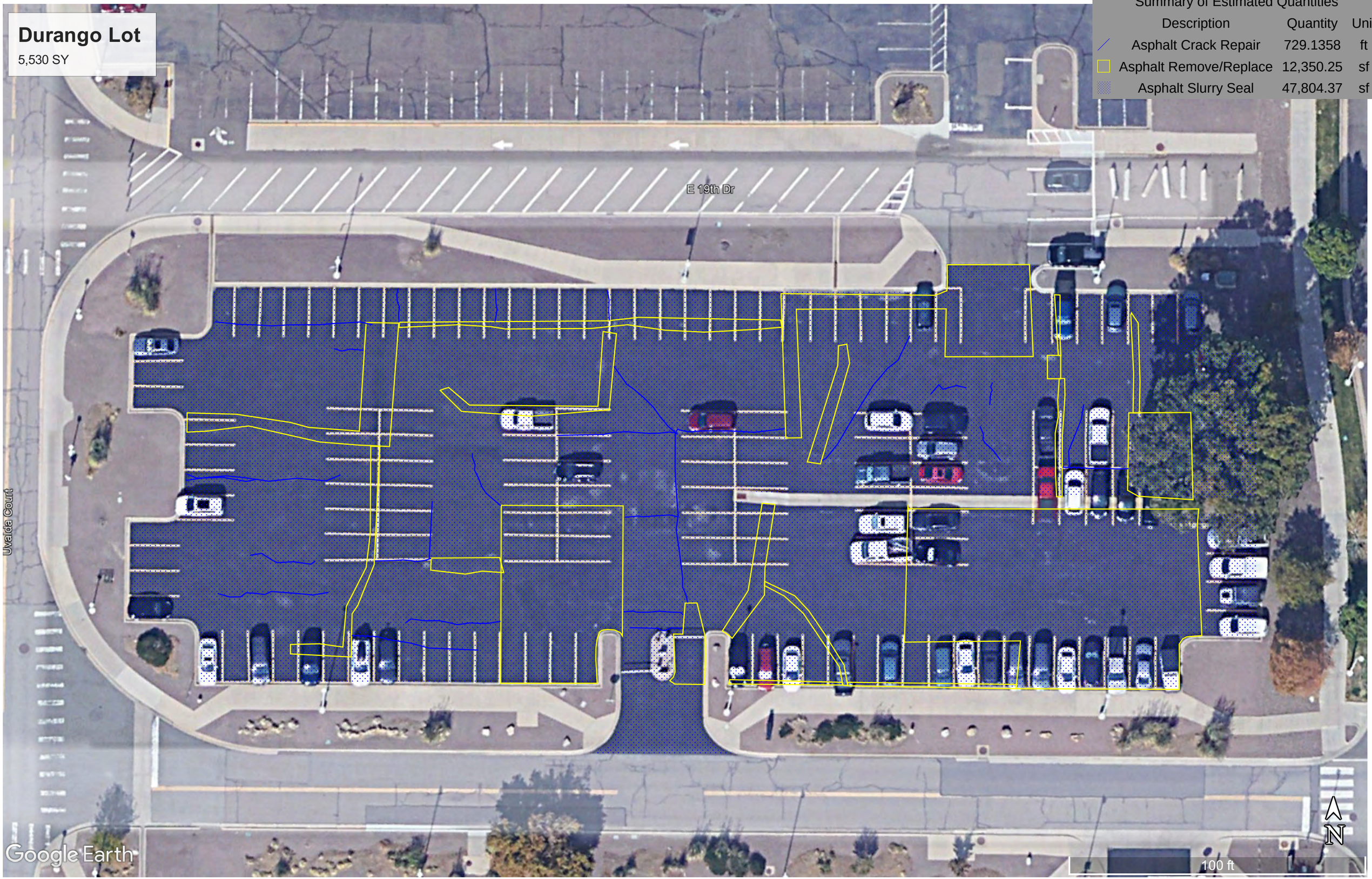
Description	Quantity	Unit
Asphalt Crack Repair	1,375.7910	ft
Asphalt Remove/Replace	47,007.03	sf
Asphalt Slurry Seal	204,987.30	sf
Concrete Remove/Replace	54.97	sf



Durango Lot

5,530 SY

Summary of Estimated Quantities		
Description	Quantity	Unit
Asphalt Crack Repair	729.1358	ft
Asphalt Remove/Replace	12,350.25	sf
Asphalt Slurry Seal	47,804.37	sf



Frisco Lot

12,070 SY

Summary of Estimated Quantities		
Description	Quantity	Unit
Asphalt Crack Repair	245.1575	ft
Asphalt Remove/Replace	15,321.84	sf
Asphalt Slurry Seal	109,878.20	sf
Concrete Remove/Replace	298.93	sf

Frisco Parking Lot (Staff Only)

N

100 ft

Google Earth

Leadville Lot

11,030 SY

Summary of Estimated Quantities

Description	Quantity	Unit
Asphalt Crack Repair	1,683.1960	ft
Asphalt Remove/Replace	17,335.07	sf
Asphalt Slurry Seal	94,047.66	sf
Concrete Remove/Replace	118.78	sf

EXHIBIT D – SUGGESTED IMPROVEMENTS FOR PHASE II

CU Anschutz Parking Lot Repairs (23-01226)
March 24, 2023

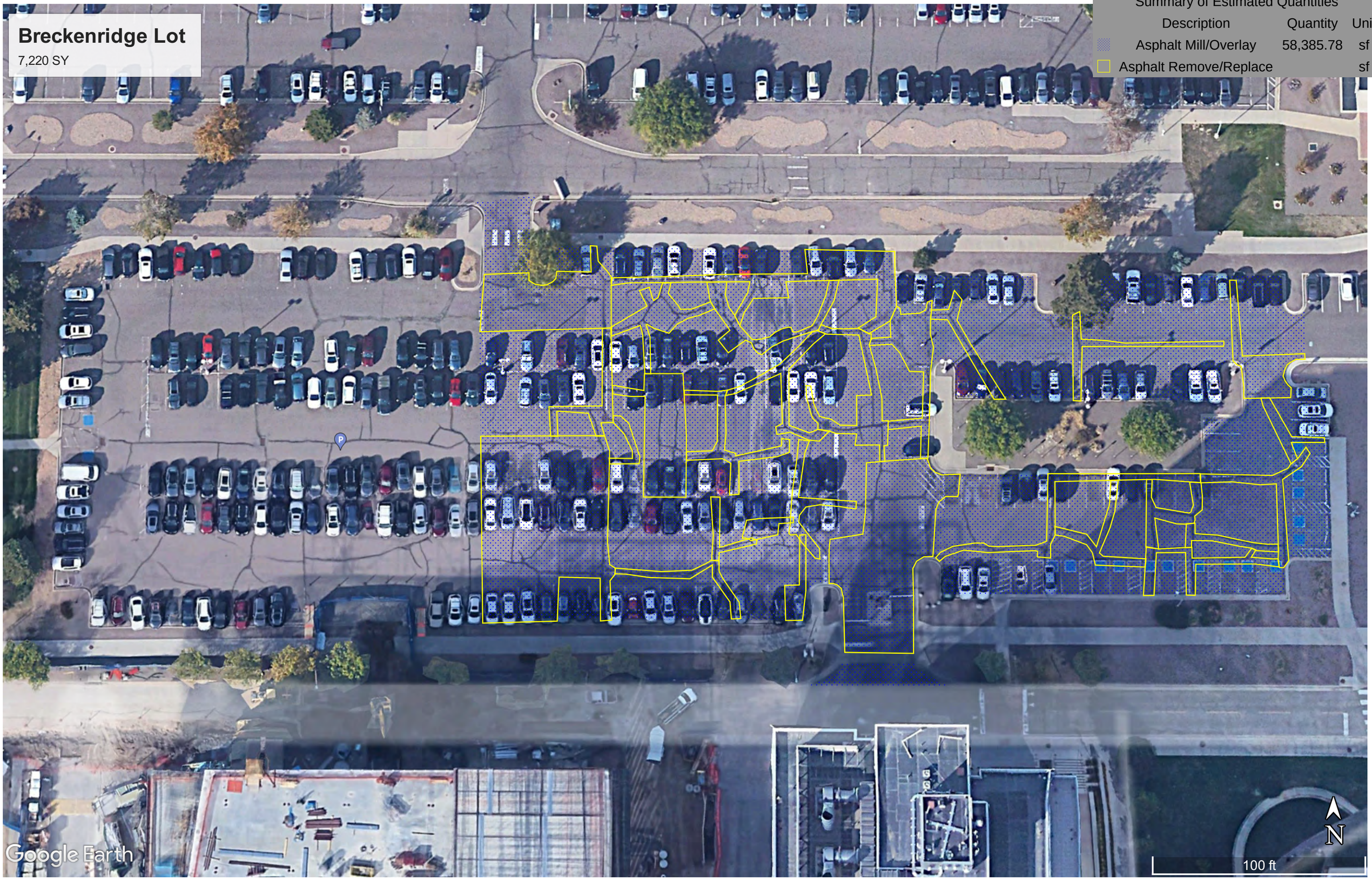
MARTIN/MARTIN CONSULTING ENGINEERS

	SUMMARY OF ESTIMATED QUANTITIES				
	Asphalt Crack Repair [LF]	Asphalt Full-Depth Remove/ Replace [SF]	Asphalt Slurry Seal [SF]	Asphalt Milling/ 2" Overlay [SF]	Pavement Markings (High Build Acrylic) [LS]
Breckenridge Lot	0	16,328	0	58,386	1
Evergreen Lot	1,512	32,869	104,301	0	1
Purgatory Lot	0	10,740	0	43,147	1
Totals	**1,512**	**59,937**	**104,301**	**101,533**	

Breckenridge Lot

7,220 SY

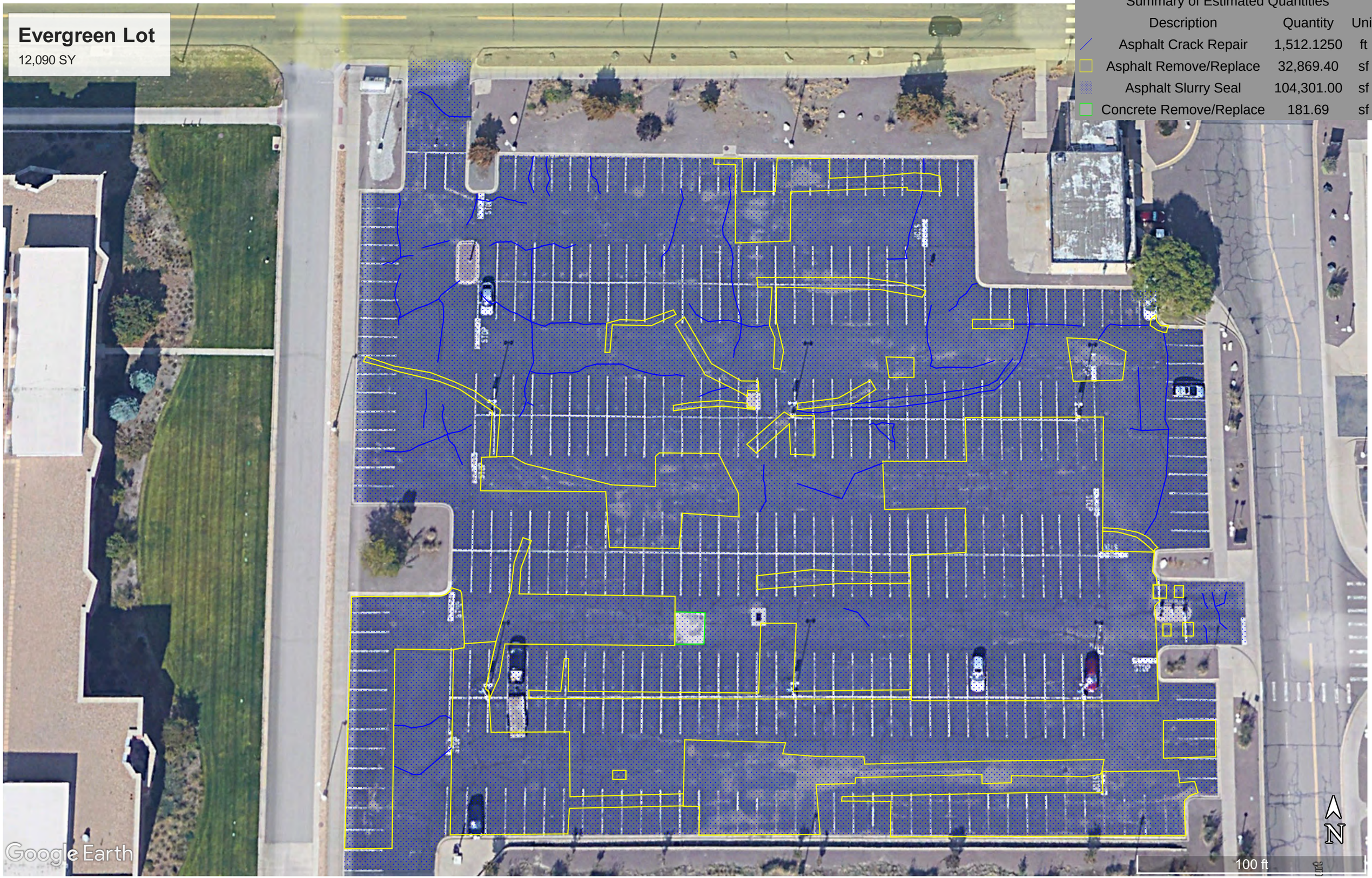
Summary of Estimated Quantities		
Description	Quantity	Unit
Asphalt Mill/Overlay	58,385.78	sf
Asphalt Remove/Replace		sf



Evergreen Lot

12,090 SY

Summary of Estimated Quantities		
Description	Quantity	Unit
Asphalt Crack Repair	1,512.1250	ft
Asphalt Remove/Replace	32,869.40	sf
Asphalt Slurry Seal	104,301.00	sf
Concrete Remove/Replace	181.69	sf



Purgatory Lot

4,690 SY

Summary of Estimated Quantities		
Description	Quantity	Unit
Asphalt Mill/Overlay	43,146.82	sf
Asphalt Remove/Replace		sf

90 ft

N