LAWSON ARMY AIRFIELD PHASE II/MAIN POST PHASE I STORMWATER ASSESSMENT AND CAPITAL IMPROVEMENT PLAN

Prepared For: Columbus Water Works

Columbus Water Works®

Serving our Community
Protecting the Environment

September 2018

3.0 RECOMMENDATIONS

The following recommendations for replacement and repairs are based on the visual condition assessment previously described as well as the hydraulic capacity analysis throughout the study area.

3.1 CONDITION

Replacement or repair was recommended for structures and storm drains with Grades 4 and 5 due to current or imminent failure. Several issues contributed to Grade 4 assets depending on the storm drain material. As previously described, a combination of the following defects often led to the assignment of a Grade 4 asset: holes, settled deposits (Figure 27, Figure 28), infiltration with sinkholes, joint separation, rusted surfaces (Figure 29), and missing coating (Figure 30).

Figure 27: Concrete Deposits

Figure 28: Settled Deposits

Figure 29: Rusted Invert

Figure 30: Missing Coating

Grade 5 was assigned to assets that had failed, classified by crushed pipes (Figure 31), broken pipes (Figure 32), major holes, etc. In addition to storm drains, structures that were categorized as Grade 5 included inlets which need to be removed and replaced (Figure 33), headwalls which need to be rebuilt (Figure 34), and flumes which were cracked and washed out (Figure 35).

Figure 31: Crushed Pipe

Figure 32: Broken Pipe

Figure 33: Damaged Grate

Figure 34: Damaged Headwall

Figure 35: Cracked Flume with Erosion

Assets were assigned Grade “Incomplete” if they were unable to be evaluated in this phase of the project due to debris in the invert of the pipe preventing CCTV or access issues into different areas on Fort Benning. Incomplete assets received an improvement recommendation corresponding to its accessibility deficiency and recommendation to reevaluate the asset. Assets such as roof drains, trench drains and parking lot underdrains were given Grade “Other” because their pipe size was too small to CCTV and would not be included in the hydraulic modeling.

3.2 HYDRAULIC CAPACITY

Of the 1,304 pipes that were evaluated, 247 exceeded capacity, indicated by surcharging under the 25-year, 24-hour design criteria. Of the 247 pipes that surcharged, 11 pipes back up into open channels which provide adequate storage for the excess volume and therefore do not require any modification or replacement. The pipes with a backwater storage condition were typically located under roadways and connected one open channel to another. Inlets or headwalls in areas that allow ponding to occur are present in 104 of the surcharging pipes, which assists in reducing downstream peak flows by allowing temporary detention. At these locations, the maximum hydraulic grade line was compared to the outer elevation of the depression. In this evaluation, it was determined that if a structure overflowed onto airfield pavement, roads, parking lots or near a building, a network stormwater system modification would be necessary to improve hydraulic capacity. Six stormwater system modification options were considered in this study and are as follows:

- Pipe upsizing
- Channel upsizing
- Pipe rerouting
- Pipe replacement with open channel
- Replace pipe to adjust inverts to create a positive slope
- Regional detention

It is recommended to replace corrugated metal pipe (CMP) with reinforced concrete pipe (RCP) to reduce roughness and improve hydraulic conveyance when replacement of CMP is required.

Portions of the LAAF Phase I pipe network were re-evaluated during this study because of the inclusion of the upstream stormdrain infrastructure that was not surveyed or modeled during the previous study. This need for re-evaluation shows why it its critical to complete an entire drainage basin as a single phase to prevent repetitive evaluations and the possibility of additional improvements beyond what was previously recommended or installed. Recommendations to LAAF Phase I infrastructure provided in this report include a note in Table 2.

Table 2 through Table 6 outline the recommended modifications to improve stormwater system performance, and Appendix H provides figures that display the recommended stormwater system modifications and improved system performance. The recommended modifications either eliminated or minimized overflows for the 25-year, 24-hour design storm considered in this analysis.

Table 2: Pipe Upsizing

PIPE SEGMENT	MAP NO.	EXISTING SIZE (in.)	PROPOSED SIZE (in.)
LAAF-393	4	54	60
MP-670	5	30	42
MP-795	5	30	42
MP-131	5	30	42
MP-132	5	30	42
MP-133	5	30	42
MP-134	5	30	42
MP-733	6	24	30
MP-740	6	12	15
MP-1155	6	30	42
MP-65	7	42	60
MP-618	7	42	48
MP-1538	8	24	36
MP-75	8	24	30
MP-1537	8	24	30
MP-1536	8	15	24
MP-1532	8	15	18
MP-1531	8	15	18
MP-1677	9	42	54
MP-1678	9	42	54
MP-882	9	42	54
MP-903	9	24	36
MP-904	9	24	36
MP-935	9	36	42
MP-937	9	36	42
MP-884	9	36	42
MP-1039	10	48	60
LAAF-1674	10	36	48
MP-100	10	18	24
LAAF-1649	10	18	24
MP-643	10	18	24
MP-644	10	12	24
MP-101	10	15	24
MP-98	10	24	30
MP-258	11	30	36
MP-262	11	15	24
MP-1326/1327	12	48 (Two Barrels)	72 (Two Barrels)

Table 2: Pipe Upsizing (Cont'd)

PIPE SEGMENT	MAP NO.	EXISTING SIZE (in.)	PROPOSED SIZE (in.)
MP-49	12	36	48
MP-54	12	36	42
MP-52	12	30	36
MP-46	12	48	54
MP-45	12	36	54
MP-1328	12	36	54
MP-44	12	36	54
MP-37	12	36	54
MP-63	12	36	42
MP-34	12	30	42
MP-33	12	30	36
MP-1343	12	24	36
MP-1342	12	24	36
MP-21	12	24	30
MP-19	12	18	30
MP-48	12	42	48

Table 3: Channel Upsizing

CHANNEL SEGMENT	MAP NO.	EXISTING WIDTH (ft.)	PROPOSED WIDTH (ft.)
LAAF-304	1 & 3	8	20
SDGM-719*	3	13	25
SDGM-439*	3	14	25
SDGM-650*	3	5	25

*LAAF Phase I infrastructure

Table 4: Rerouted Pipes

PIPE SEGMENT	MAP NO.	EXISTING SIZE (in.)	EXISTING LENGTH (ft.)	PROPOSED SIZE (in.)	PROPOSED LENGTH (ft.)
LAAF-77	5	242	43	242	27
MP-845	5	30	185	42	531
MP-48	13	42	125	48	133

Table 5: Pipes Replaced with Open Channels

PIPE SEGMENT	MAP NO.	EXISTING SIZE (in.)	CHANNEL SIZE (ft.)	CHANNEL LENGTH (ft.)	CHANNEL MATERIAL
MP-76	8	18	W = 2, D = 2.5	305	Earth
MP-77	8	18	W = 2, D = 2.5	200	Earth
LAAF-17	1	24	W = 3, D = 3.5	233	Earth
LAAF-218	1	24	W = 3, D = 1.5	116	Earth

Table 6: Replace Pipe to Modify Slopes

PIPE SEGMENT	MAP NO.	EXISTING SLOPE (ft./ft.)	PROPOSED SLOPE (ft./ft.)	INLET INVERT (ft.)	OUTLET INVERT (ft.)
LAAF-77	2	N/A	0.0216	242.58	242.00
LAAF-75	2	0.0457	0.0433	242.00	243.03
MP-798	5	-0.0022	0.0101	325.08	324.00
MP-799	5	0.0010	0.0049	324.00	323.90
MP-800	5	0.0074	0.0143	323.90	322.05
MP-19	12	-0.0030	0.0020	302.90	302.80
MP-1328	12	-0.0061	0.0006	300.59	300.57
MP-1342	12	-0.0079	0.0019	302.50	302.40
MP-1343	12	0.0222	0.0041	302.40	302.20
MP-21	12	0.0029	0.0018	302.80	302.50
MP-33	12	0.0032	0.0019	302.20	301.90
MP-34	12	0.0017	0.0022	301.90	301.40
MP-37	12	0.0006	0.0019	300.80	300.60
MP-44	12	-0.0111	0.0004	300.60	300.57
MP-45	12	0.0014	0.0002	300.57	300.54
MP-46	12	0.0044	0.0006	300.54	300.51
MP-47	12	0.0106	0.0009	300.51	300.49
MP-48	12	0.0055	0.0008	301.00	300.90
MP-49	12	-0.0034	0.0018	301.19	301.00
MP-52	12	-0.0008	0.0041	302.39	301.89
MP-53	12	-0.0007	0.0015	301.89	301.71
MP-63	12	0.0058	0.0026	301.40	300.80

Table 7: Proposed Detention Ponds

MODEL UNIT/ ASSET ID	MAP NO.	DOWNSTREAM PIPE SEGMENT	DEPTH (ft.)	MAXIMUM AREA (sq. ft.)
1	1	LAAF-255	3.0	125,000
2	1	LAAF-16	4.0	8,000
3	1	LAAF-18	3.0	50,000
4	1	LAAF-204/ LAAF-205	3.0	5,000
5	1	LAAF-259	3.8	5,000
6	1	MP-661	3.1	50,000
7	1	LAAF-58	2.0	3,500
8	1	LAAF-78	3.0	30,000
9	1	LAAF-263/ LAAF-264	3.0	20,000
10	1	LAAF-466	4.0	4,000
11	1	LAAF-467	3.0	1,800
12	1	LAAF-472	3.3	3,500
13	1	LAAF-302	2.8	2,000
14	1	SDGM-44	7.2	10,000
15	1	LAAF-57	6.9	11,000
16	1	LAAF-50	3.0	5,500
17	1	LAAF-54	4.0	10,000
18	1	LAAF-56	3	5,000
STRC-5364	13	MP-1796	6.3	19,500

4.0 SUMMARY

The following is a summary of the work completed and recommendations for subsequent work.

4.1 OBSERVATIONS

When compiled, there are few instances in which an asset was unsatisfactory with regard to both condition and hydraulic analysis. Instead, where deficiencies were identified, it was typically either a structural or a hydraulic issue but not both. Additionally, it was expected that illicit connections between the storm and sanitary sewer systems would be discovered. However, this was not the case, as no illicit connections were discovered in this phase.

4.2 NEXT STEPS

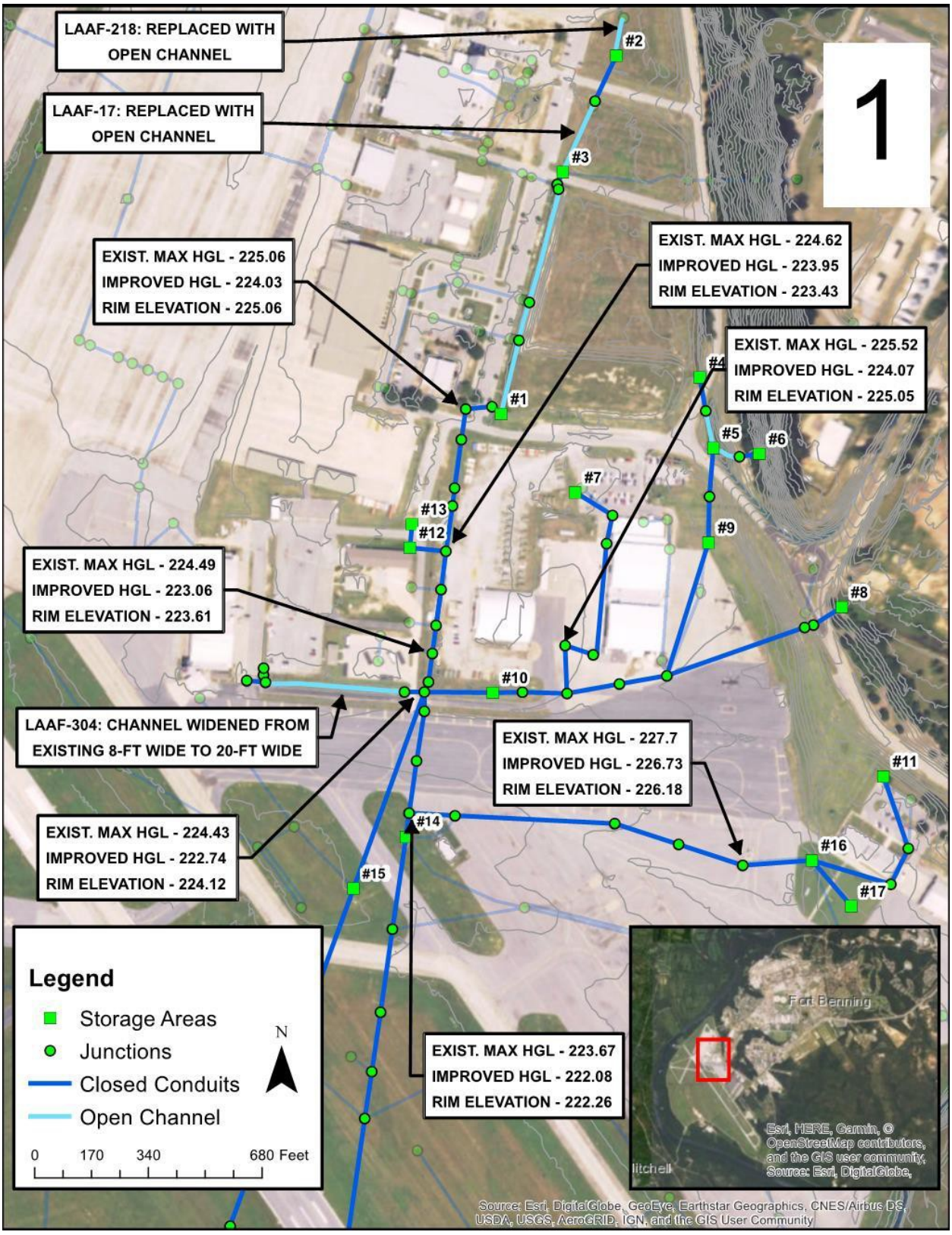
Due to the volume of unmapped or incorrectly mapped stormwater infrastructure, previously assessed infrastructure with structure or capacity issues, and the possibility for illicit connections, it is imperative to continue the assessment of stormwater infrastructure throughout Main Post and the remainder of Fort Benning. Additionally, it is recommended that all assets in previous phases be re-inspected 10 years from their original assessment date to evaluate their condition and address any required maintenance and repairs. It is crucial that the recommended repairs be completed in a timely manner due to the risk of failure for Grade 4 assets and the lack of function for the Grade 5 assets, which could potentially lead to severe and urgent problems in the near future.

4.3 REPAIRS

Storm structures and storm drains which received a Grade 4 or 5 in the condition assessment (see Figure 36), and pipes which need to be upsized as indicated by the hydraulic capacity analysis are recommended for repair. Detailed maps of the hydraulic capacity recommended repairs can be found in Appendix H and condition assessment recommended repairs maps can be found in Appendix I. Further details of the recommended repairs can be found in the supplied geodatabase. The recommended repairs have been broken down into three recommended projects based on the type of work required:

1. Open trench replacement and earthwork
2. Trenchless rehabilitation
3. Detention ponds

APPENDIX H: MAPS OF RECOMMENDED REPAIRS BASED ON HYDRAULIC CAPACITY ANALYSIS


LAAF-218: REPLACED WITH OPEN CHANNEL
LAAF-17: REPLACED WITH OPEN CHANNEL
EXIST. MAX HGL - 225.06
IMPROVED HGL - 224.03
RIM ELEVATION - 225.06
EXIST. MAX HGL - 224.62
IMPROVED HGL - 223.95
RIM ELEVATION - 223.43
EXIST. MAX HGL - 225.52
IMPROVED HGL - 224.07
RIM ELEVATION - 225.05
EXIST. MAX HGL - 224.49
IMPROVED HGL - 223.06
RIM ELEVATION - 223.61
LAAF-304: CHANNEL WIDENED FROM EXISTING 8-FT WIDE TO 20-FT WIDE
EXIST. MAX HGL - 227.7
IMPROVED HGL - 226.73
RIM ELEVATION - 226.18
EXIST. MAX HGL - 224.43
IMPROVED HGL - 222.74
RIM ELEVATION - 224.12
EXIST. MAX HGL - 223.67
IMPROVED HGL - 222.08
RIM ELEVATION - 222.26
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
#13
#14
#15
#16
#17
1
Legend
Storage Areas
Junctions
Closed Conduits
Open Channel
N
0 170 340 680 Feet
Fort Benning
Mitchell
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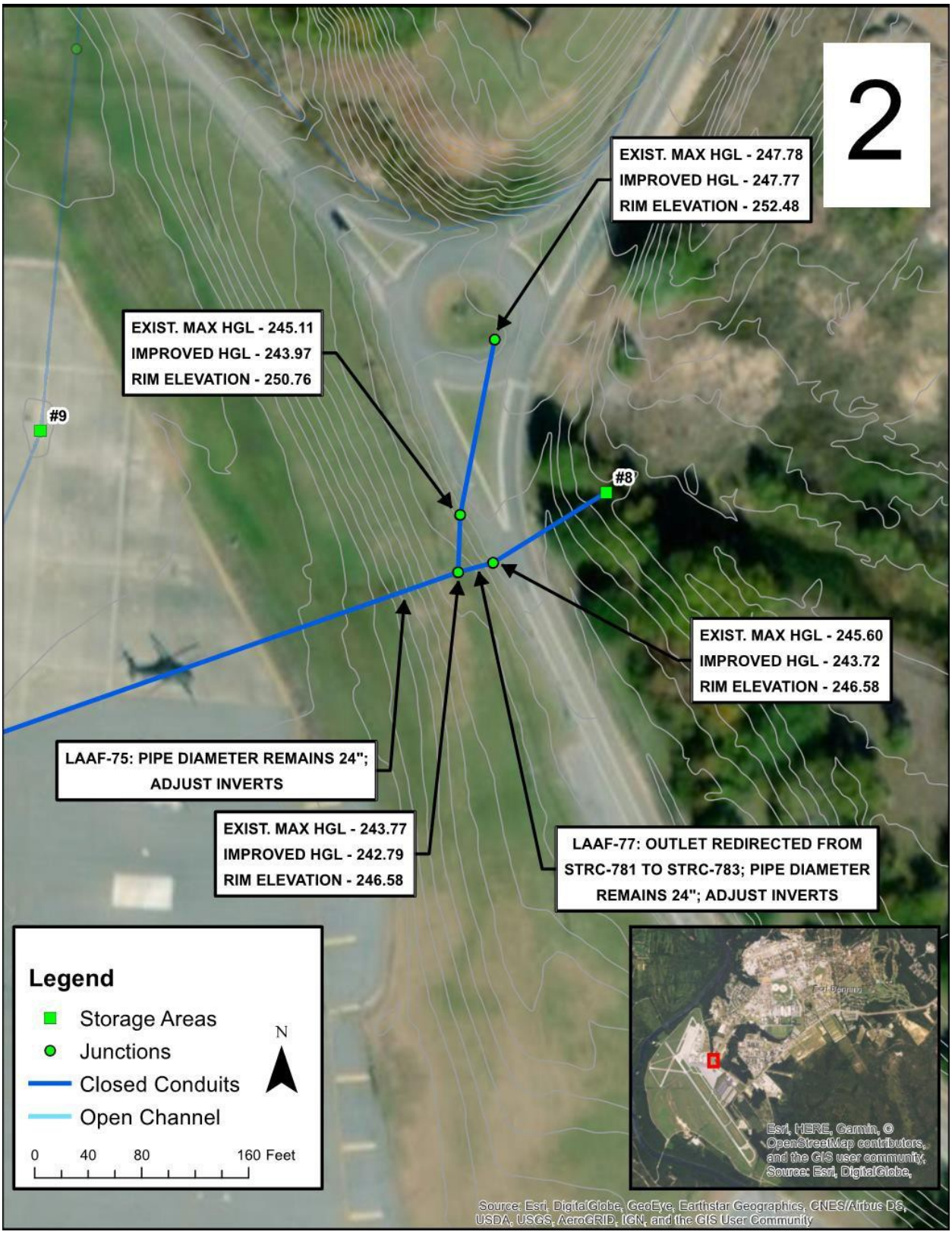
2
EXIST. MAX HGL - 247.78
IMPROVED HGL - 247.77
RIM ELEVATION - 252.48
EXIST. MAX HGL - 245.11
IMPROVED HGL - 243.97
RIM ELEVATION - 250.76
#9
#8
EXIST. MAX HGL - 245.60
IMPROVED HGL - 243.72
RIM ELEVATION - 246.58
LAAF-75: PIPE DIAMETER REMAINS 24"; ADJUST INVERTS
EXIST. MAX HGL - 243.77
IMPROVED HGL - 242.79
RIM ELEVATION - 246.58
LAAF-77: OUTLET REDIRECTED FROM STRC-781 TO STRC-783; PIPE DIAMETER REMAINS 24"; ADJUST INVERTS
Legend
Storage Areas
Junctions
Closed Conduits
Open Channel
N
0 40 80 160 Feet
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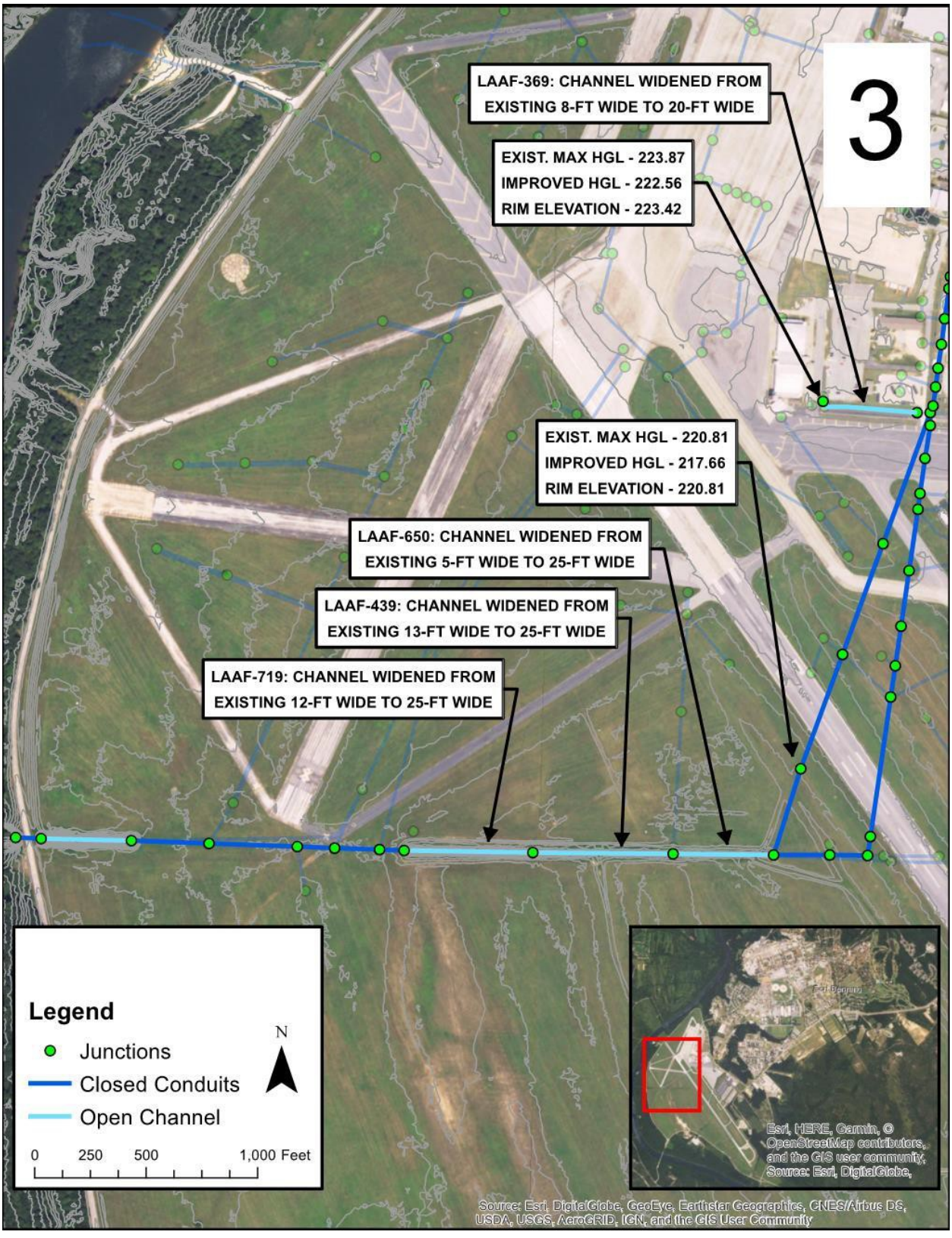
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


3
LAAF-369: CHANNEL WIDENED FROM EXISTING 8-FT WIDE TO 20-FT WIDE
EXIST. MAX HGL - 223.87
IMPROVED HGL - 222.56
RIM ELEVATION - 223.42
EXIST. MAX HGL - 220.81
IMPROVED HGL - 217.66
RIM ELEVATION - 220.81
LAAF-650: CHANNEL WIDENED FROM EXISTING 5-FT WIDE TO 25-FT WIDE
LAAF-439: CHANNEL WIDENED FROM EXISTING 13-FT WIDE TO 25-FT WIDE
LAAF-719: CHANNEL WIDENED FROM EXISTING 12-FT WIDE TO 25-FT WIDE
Legend
Junctions
Closed Conduits
Open Channel
N
0 250 500 1,000 Feet
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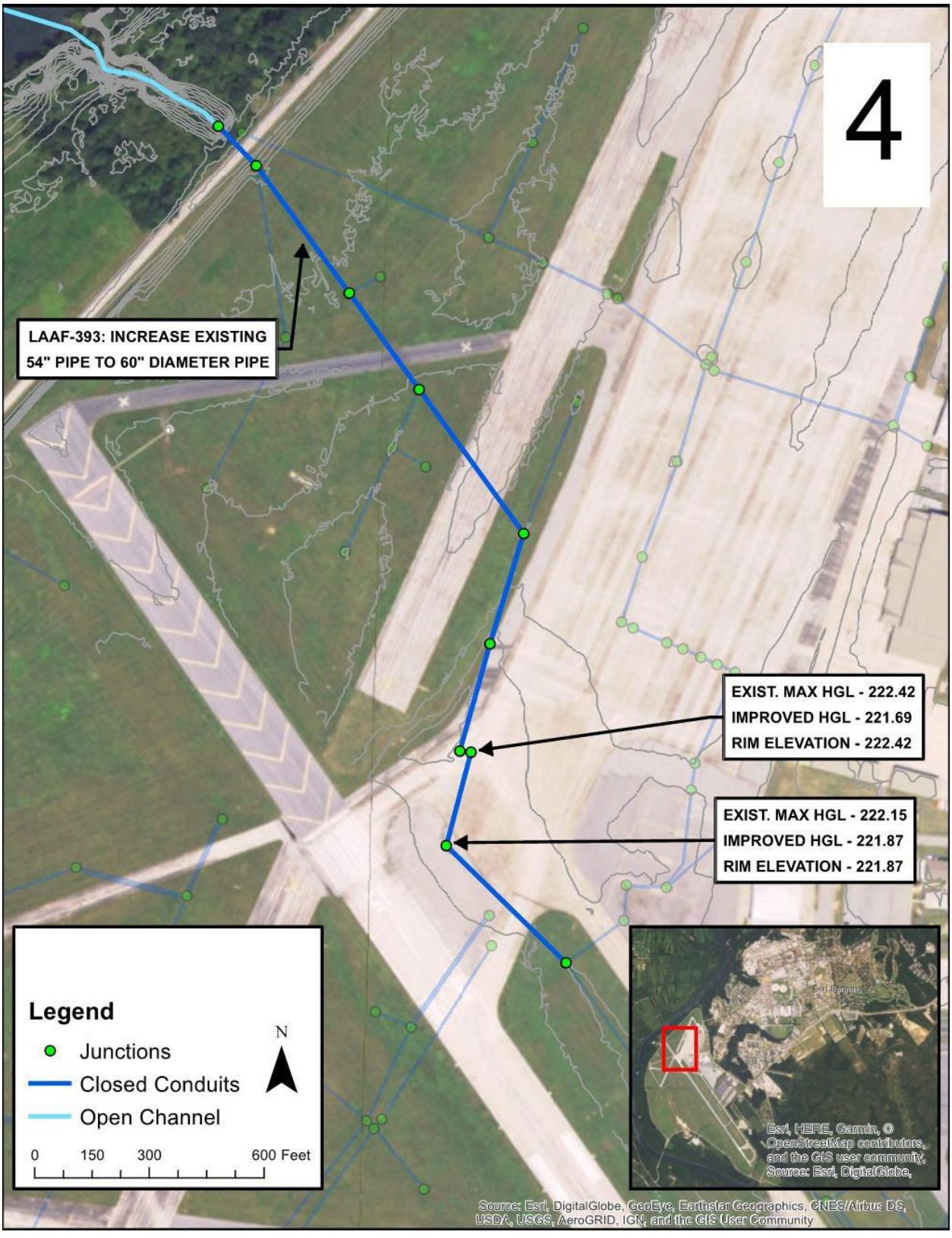
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


4
LAAF-393: INCREASE EXISTING
54" PIPE TO 60" DIAMETER PIPE
EXIST. MAX HGL - 222.42
IMPROVED HGL - 221.69
RIM ELEVATION - 222.42
EXIST. MAX HGL - 222.15
IMPROVED HGL - 221.87
RIM ELEVATION - 221.87
Legend
Junctions
Closed Conduits
Open Channel
N
0 150 300 600 Feet
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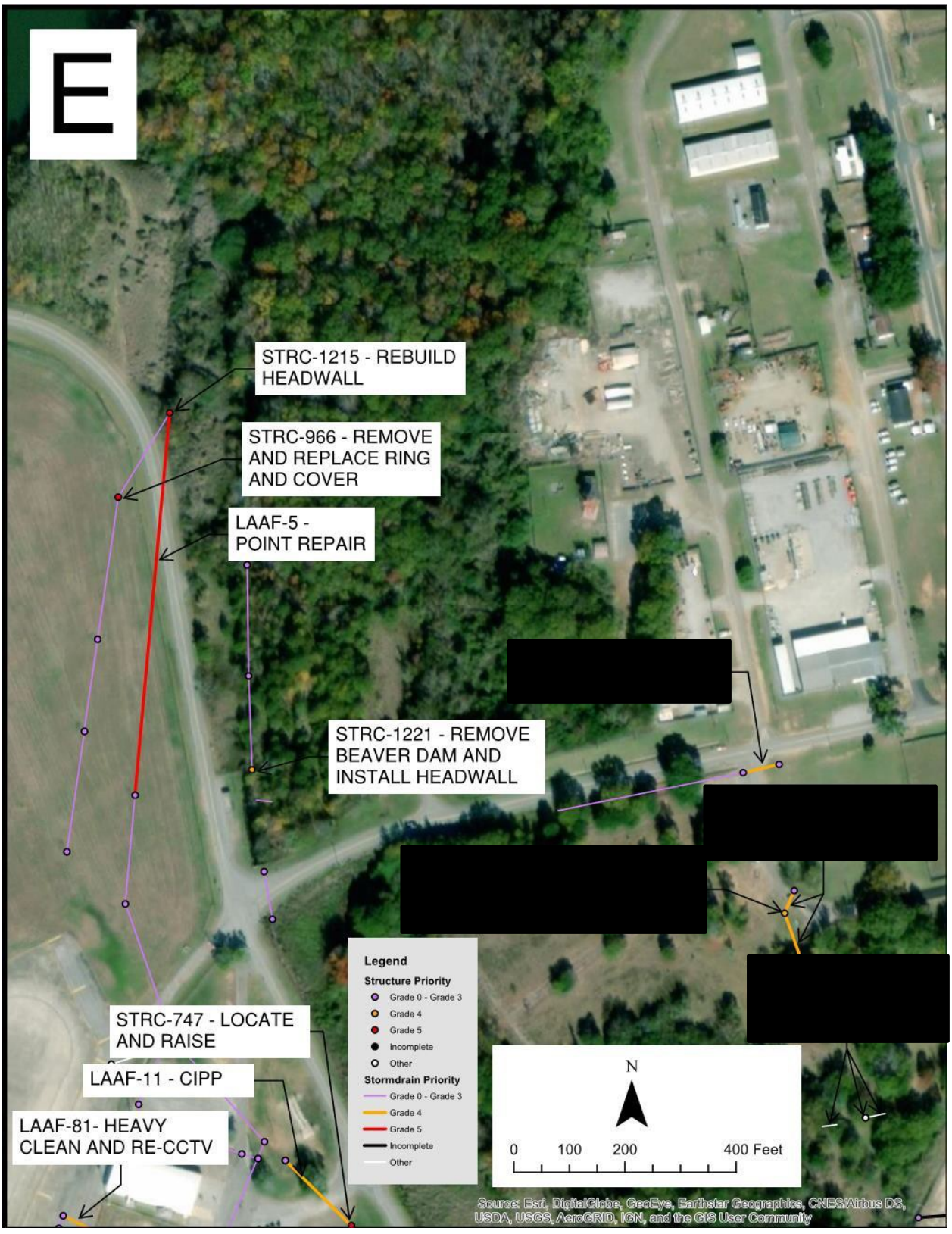
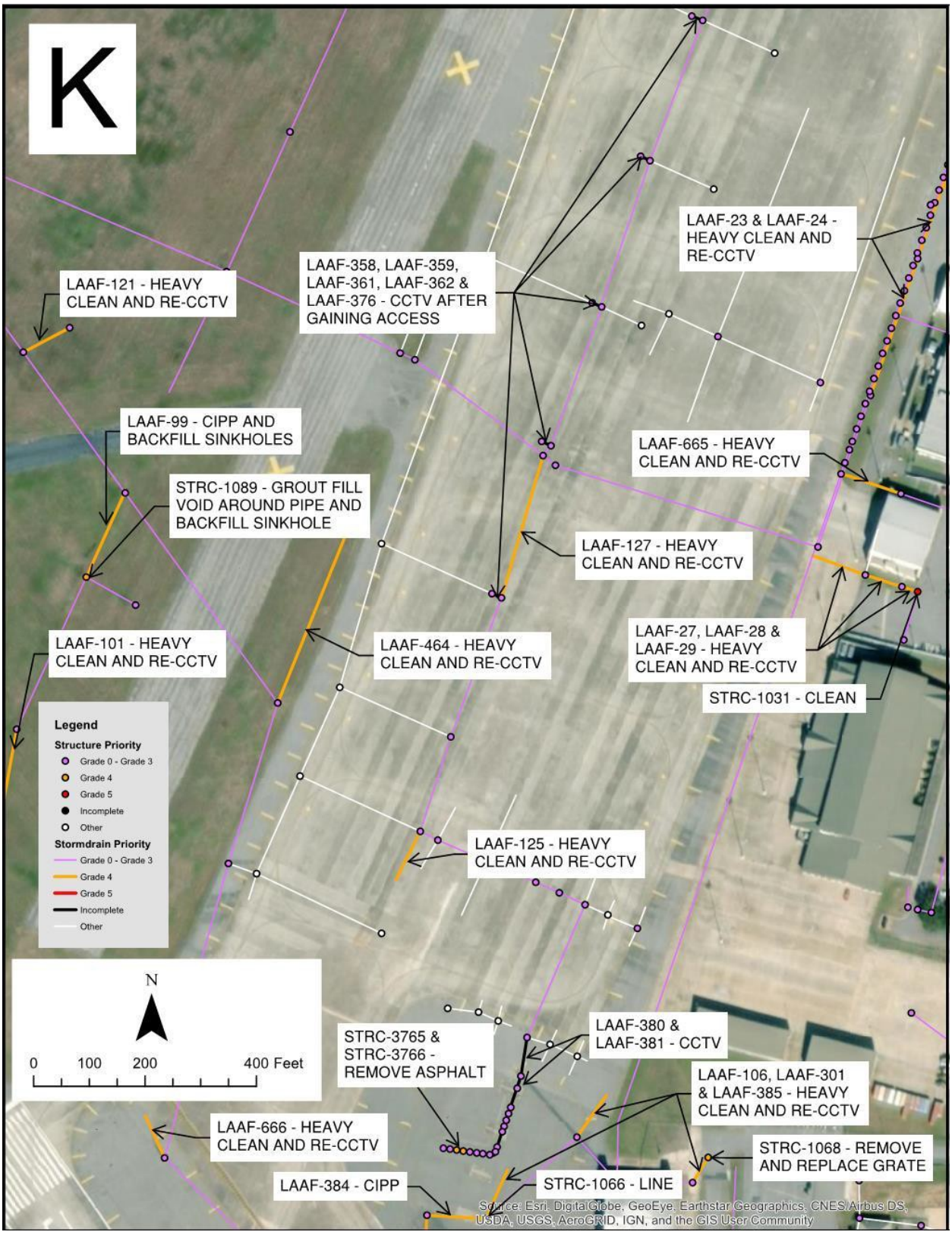
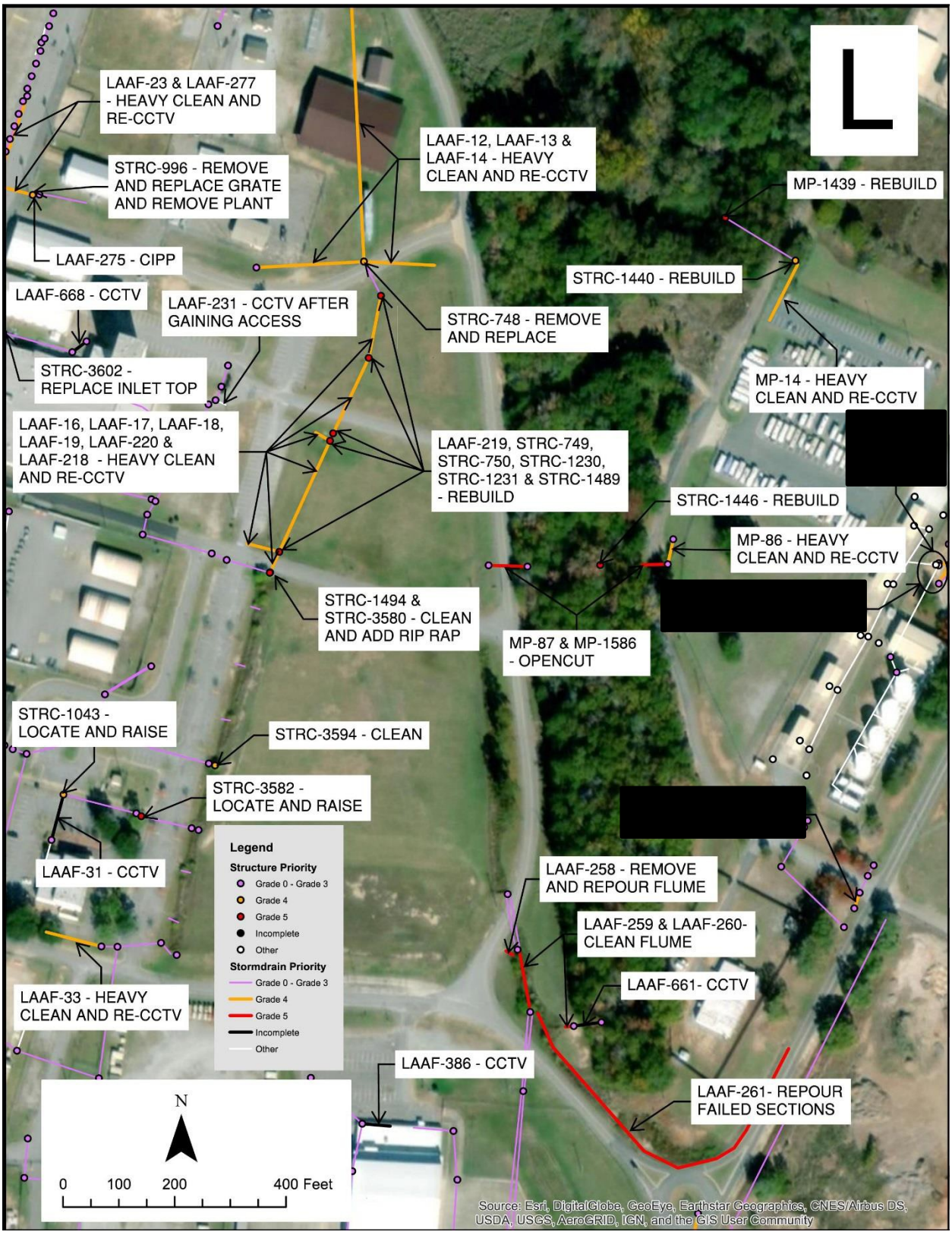
APPENDIX I: MAPS OF RECOMMENDED REPAIRS BASED ON CONDITION ASSESSMENT

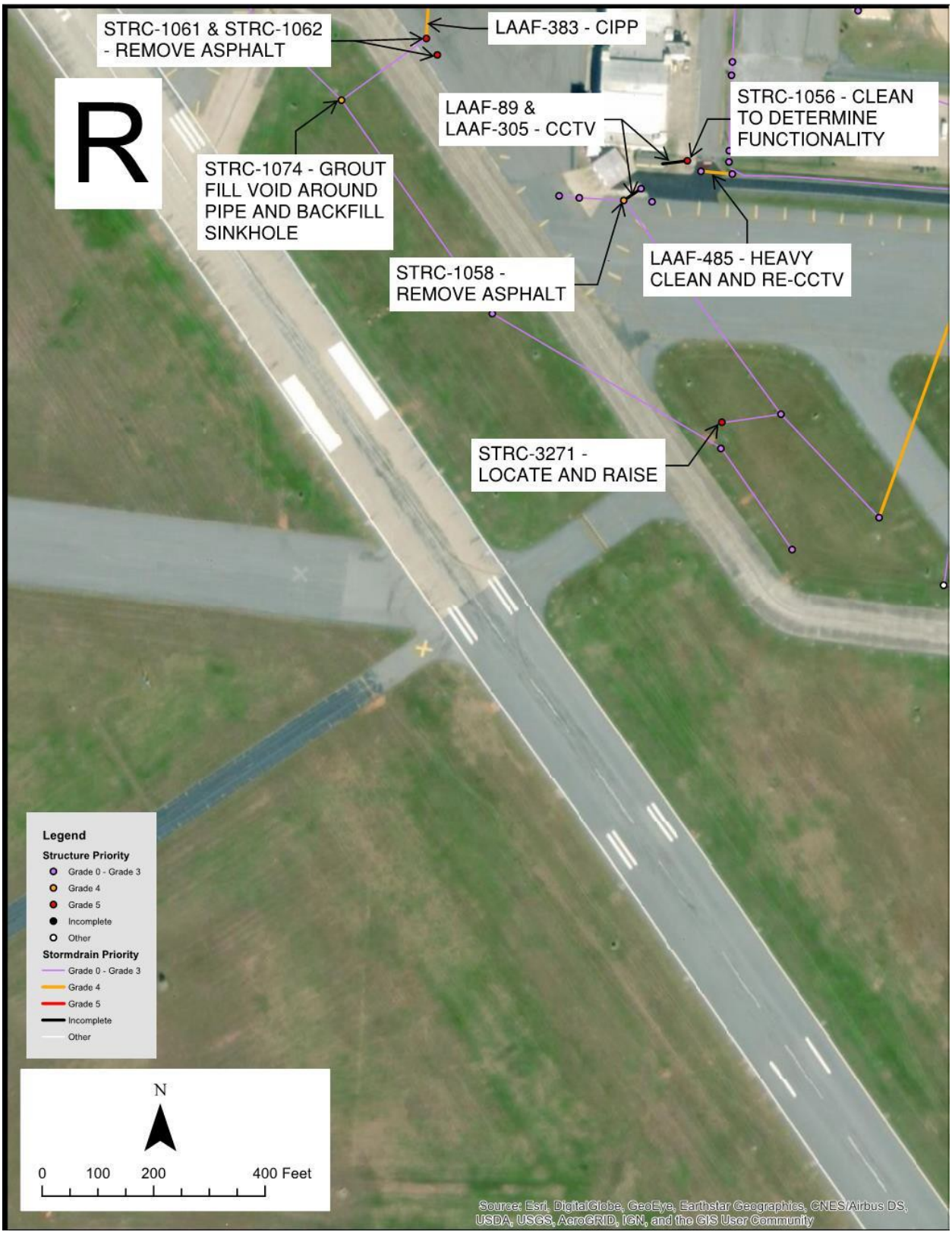

D
LAAF-279 - REMOVE AND REPLACE FLUME
STRC-1296 - REBUILD HEADWALL
LAAF-388 - CIPP
STRC-1293 - REGRADE AND REPOUR HEADWALL
STRC-1100 - GROUT FILL SOURCE OF SINKHOLES AND BACKFILL
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

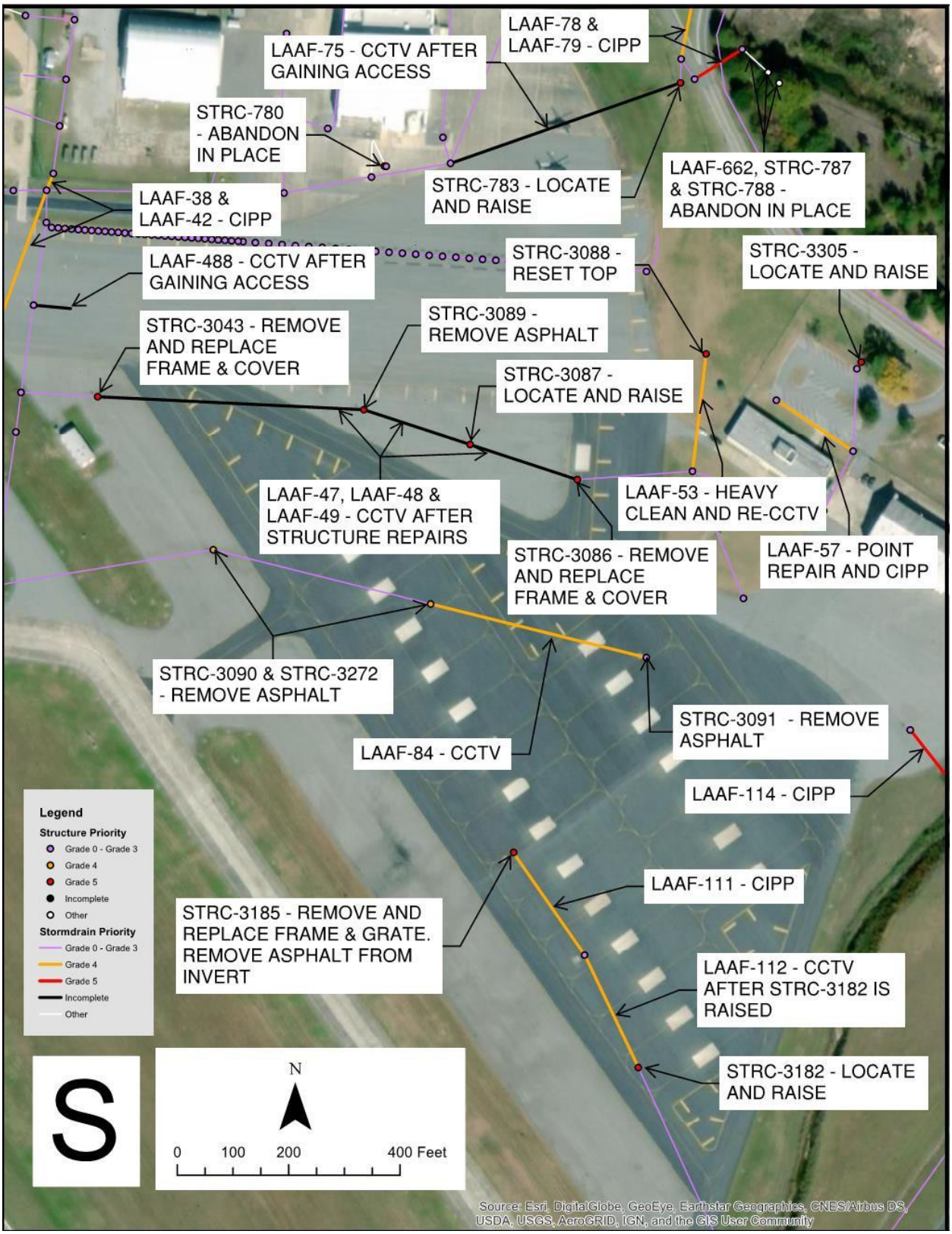

E
STRC-1215 - REBUILD HEADWALL
STRC-966 - REMOVE AND REPLACE RING AND COVER
LAAF-5 - POINT REPAIR
STRC-1221 - REMOVE BEAVER DAM AND INSTALL HEADWALL
STRC-747 - LOCATE AND RAISE
LAAF-11 - CIPP
LAAF-81- HEAVY CLEAN AND RE-CCTV
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

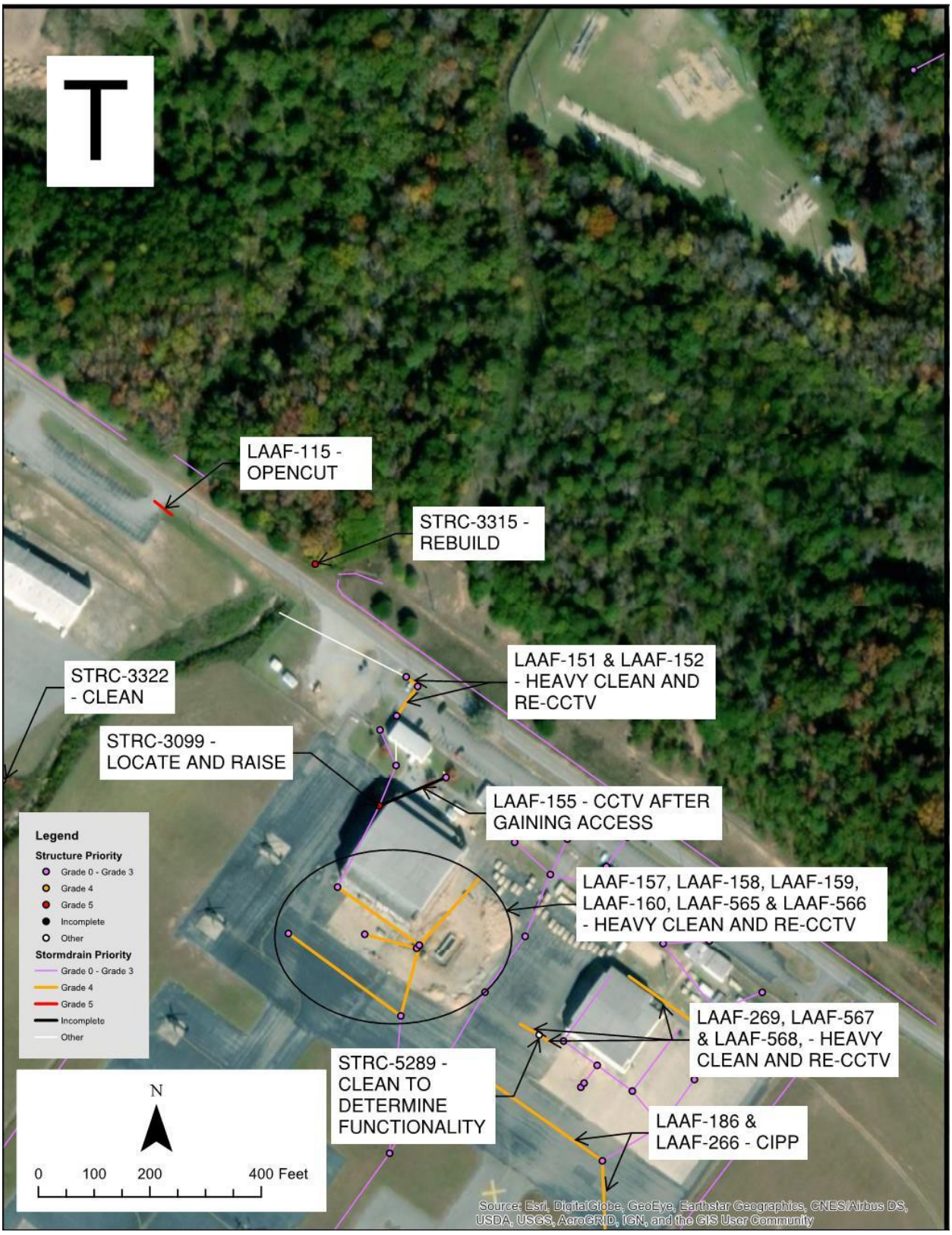

J
LAAF-118 - SPRAYCAST
LAAF-119 - CIPP
LAAF-120, LAAF-122 & LAAF-123 - HEAVY CLEAN AND RE-CCTV
LAAF-147 & LAAF-148 - HEAVY CLEAN AND RE-CCTV
STRC-1276 - LOCATE AND RAISE
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


K
LAAF-121 - HEAVY CLEAN AND RE-CCTV
LAAF-358, LAAF-359, LAAF-361, LAAF-362 & LAAF-376 - CCTV AFTER GAINING ACCESS
LAAF-23 & LAAF-24 - HEAVY CLEAN AND RE-CCTV
LAAF-99 - CIPP AND BACKFILL SINKHOLES
STRC-1089 - GROUT FILL VOID AROUND PIPE AND BACKFILL SINKHOLE
LAAF-665 - HEAVY CLEAN AND RE-CCTV
LAAF-127 - HEAVY CLEAN AND RE-CCTV
LAAF-101 - HEAVY CLEAN AND RE-CCTV
LAAF-464 - HEAVY CLEAN AND RE-CCTV
LAAF-27, LAAF-28 & LAAF-29 - HEAVY CLEAN AND RE-CCTV
STRC-1031 - CLEAN
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
LAAF-125 - HEAVY CLEAN AND RE-CCTV
N
0 100 200 400 Feet
STRC-3765 & STRC-3766 - REMOVE ASPHALT
LAAF-380 & LAAF-381 - CCTV
LAAF-106, LAAF-301 & LAAF-385 - HEAVY CLEAN AND RE-CCTV
LAAF-666 - HEAVY CLEAN AND RE-CCTV
STRC-1068 - REMOVE AND REPLACE GRATE
LAAF-384 - CIPP
STRC-1066 - LINE
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


L
LAAF-23 & LAAF-277 - HEAVY CLEAN AND RE-CCTV
STRC-996 - REMOVE AND REPLACE GRATE AND REMOVE PLANT
LAAF-275 - CIPP
LAAF-668 - CCTV
LAAF-231 - CCTV AFTER GAINING ACCESS
STRC-3602 - REPLACE INLET TOP
LAAF-16, LAAF-17, LAAF-18, LAAF-19, LAAF-220 & LAAF-218 - HEAVY CLEAN AND RE-CCTV
LAAF-12, LAAF-13 & LAAF-14 - HEAVY CLEAN AND RE-CCTV
STRC-748 - REMOVE AND REPLACE
LAAF-219, STRC-749, STRC-750, STRC-1230, STRC-1231 & STRC-1489 - REBUILD
STRC-1494 & STRC-3580 - CLEAN AND ADD RIP RAP
MP-1439 - REBUILD
STRC-1440 - REBUILD
MP-14 - HEAVY CLEAN AND RE-CCTV
STRC-1446 - REBUILD
MP-86 - HEAVY CLEAN AND RE-CCTV
MP-87 & MP-1586 - OPENCUT
STRC-1043 - LOCATE AND RAISE
STRC-3594 - CLEAN
STRC-3582 - LOCATE AND RAISE
LAAF-31 - CCTV
LAAF-33 - HEAVY CLEAN AND RE-CCTV
LAAF-258 - REMOVE AND REPOUR FLUME
LAAF-259 & LAAF-260- CLEAN FLUME
LAAF-661- CCTV
LAAF-386 - CCTV
LAAF-261- REPOUR FAILED SECTIONS
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


STRC-1061 & STRC-1062 - REMOVE ASPHALT
LAAF-383 - CIPP
R
LAAF-89 & LAAF-305 - CCTV
STRC-1056 - CLEAN TO DETERMINE FUNCTIONALITY
STRC-1074 - GROUT FILL VOID AROUND PIPE AND BACKFILL SINKHOLE
LAAF-485 - HEAVY CLEAN AND RE-CCTV
STRC-1058 - REMOVE ASPHALT
STRC-3271 - LOCATE AND RAISE
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


LAAF-75 - CCTV AFTER GAINING ACCESS
LAAF-78 & LAAF-79 - CIPP
STRC-780 - ABANDON IN PLACE
STRC-783 - LOCATE AND RAISE
LAAF-662, STRC-787 & STRC-788 - ABANDON IN PLACE
LAAF-38 & LAAF-42 - CIPP
LAAF-488 - CCTV AFTER GAINING ACCESS
STRC-3088 - RESET TOP
STRC-3305 - LOCATE AND RAISE
STRC-3043 - REMOVE AND REPLACE FRAME & COVER
STRC-3089 - REMOVE ASPHALT
STRC-3087 - LOCATE AND RAISE
LAAF-47, LAAF-48 & LAAF-49 - CCTV AFTER STRUCTURE REPAIRS
LAAF-53 - HEAVY CLEAN AND RE-CCTV
STRC-3086 - REMOVE AND REPLACE FRAME & COVER
LAAF-57 - POINT REPAIR AND CIPP
STRC-3090 & STRC-3272 - REMOVE ASPHALT
STRC-3091 - REMOVE ASPHALT
LAAF-84 - CCTV
LAAF-114 - CIPP
LAAF-111 - CIPP
STRC-3185 - REMOVE AND REPLACE FRAME & GRATE. REMOVE ASPHALT FROM INVERT
LAAF-112 - CCTV AFTER STRC-3182 IS RAISED
STRC-3182 - LOCATE AND RAISE
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
S
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


T
LAAF-115 - OPENCUT
STRC-3315 - REBUILD
LAAF-151 & LAAF-152 - HEAVY CLEAN AND RE-CCTV
STRC-3322 - CLEAN
STRC-3099 - LOCATE AND RAISE
LAAF-155 - CCTV AFTER GAINING ACCESS
LAAF-157, LAAF-158, LAAF-159, LAAF-160, LAAF-565 & LAAF-566 - HEAVY CLEAN AND RE-CCTV
LAAF-269, LAAF-567 & LAAF-568, - HEAVY CLEAN AND RE-CCTV
STRC-5289 - CLEAN TO DETERMINE FUNCTIONALITY
LAAF-186 & LAAF-266 - CIPP
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
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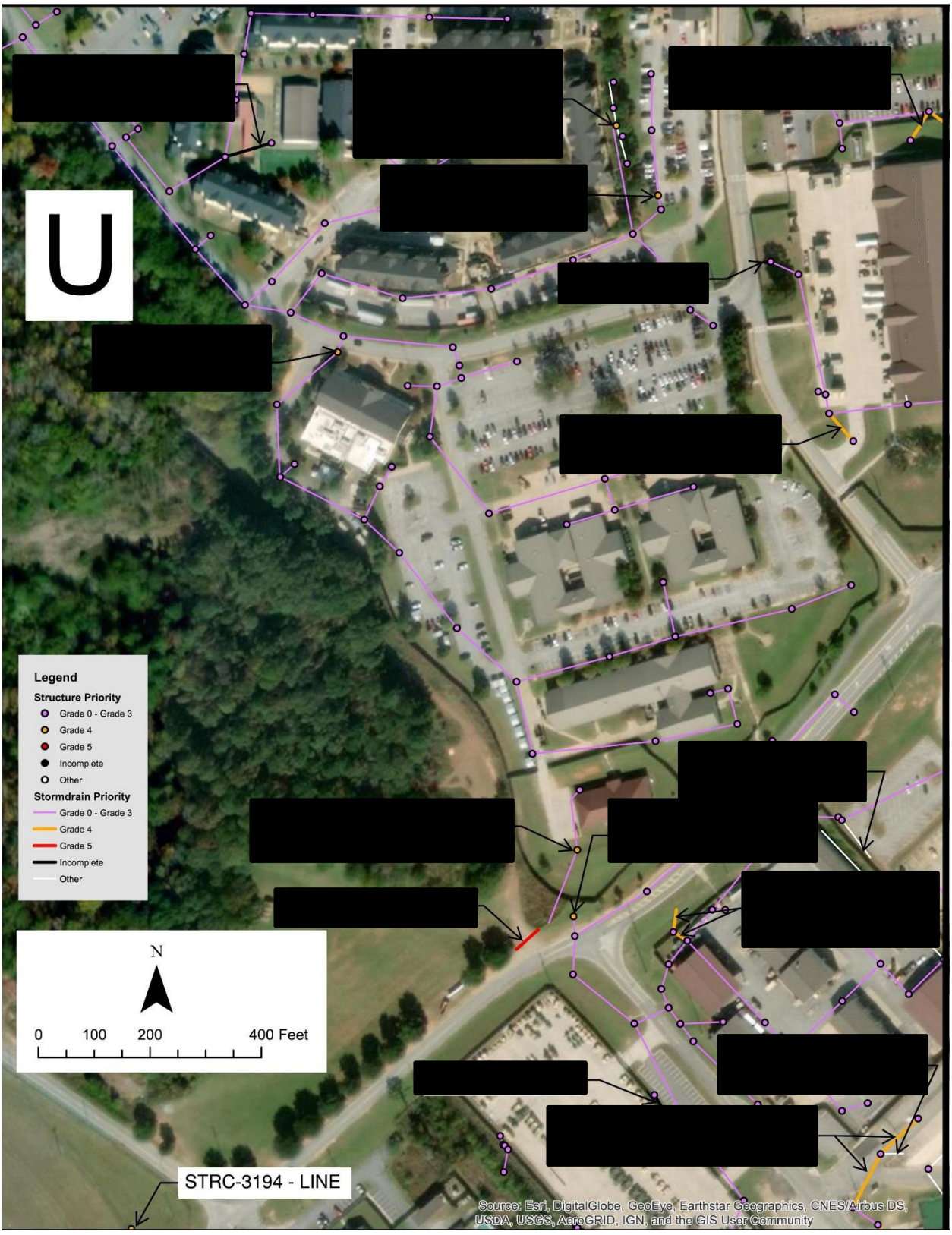
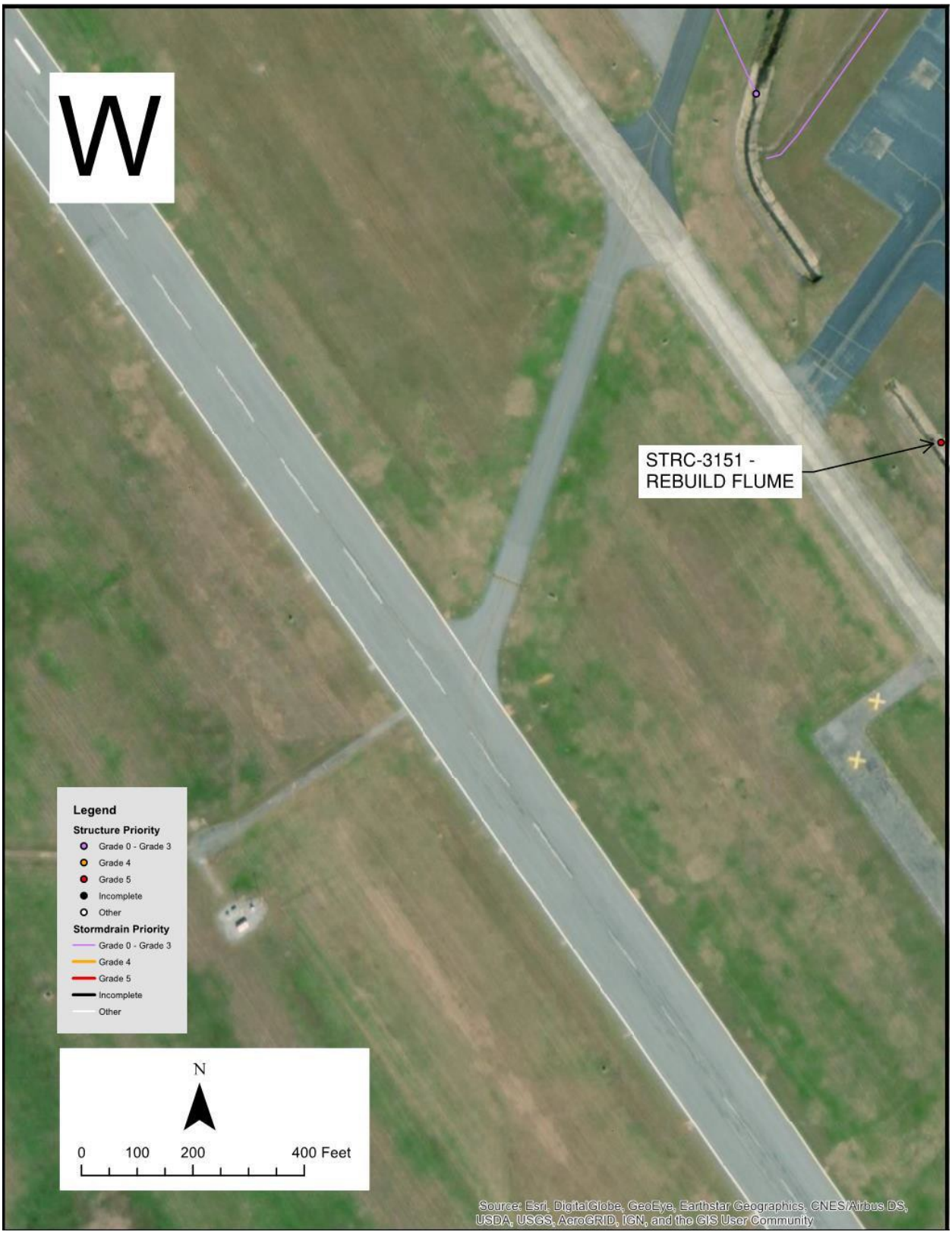
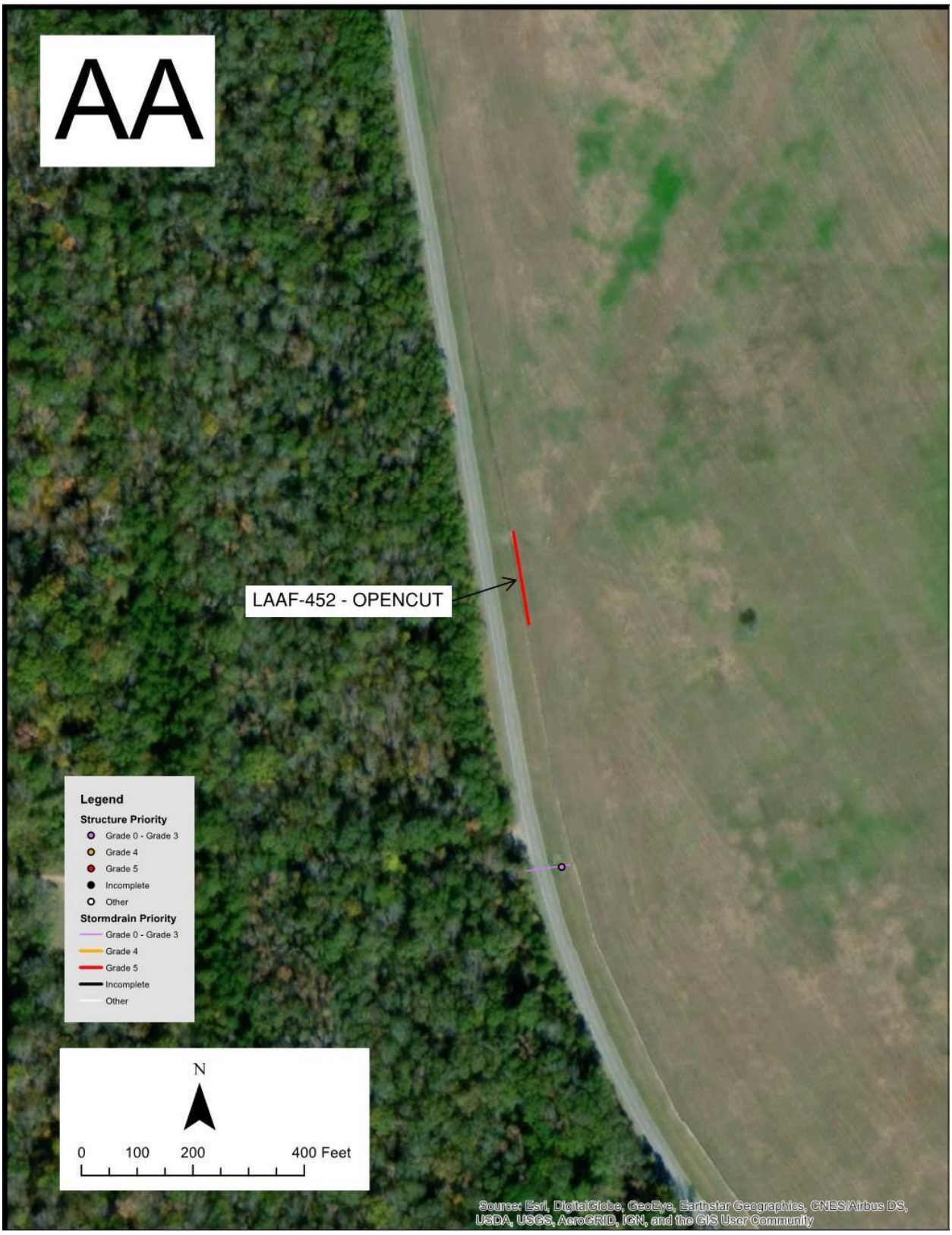
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

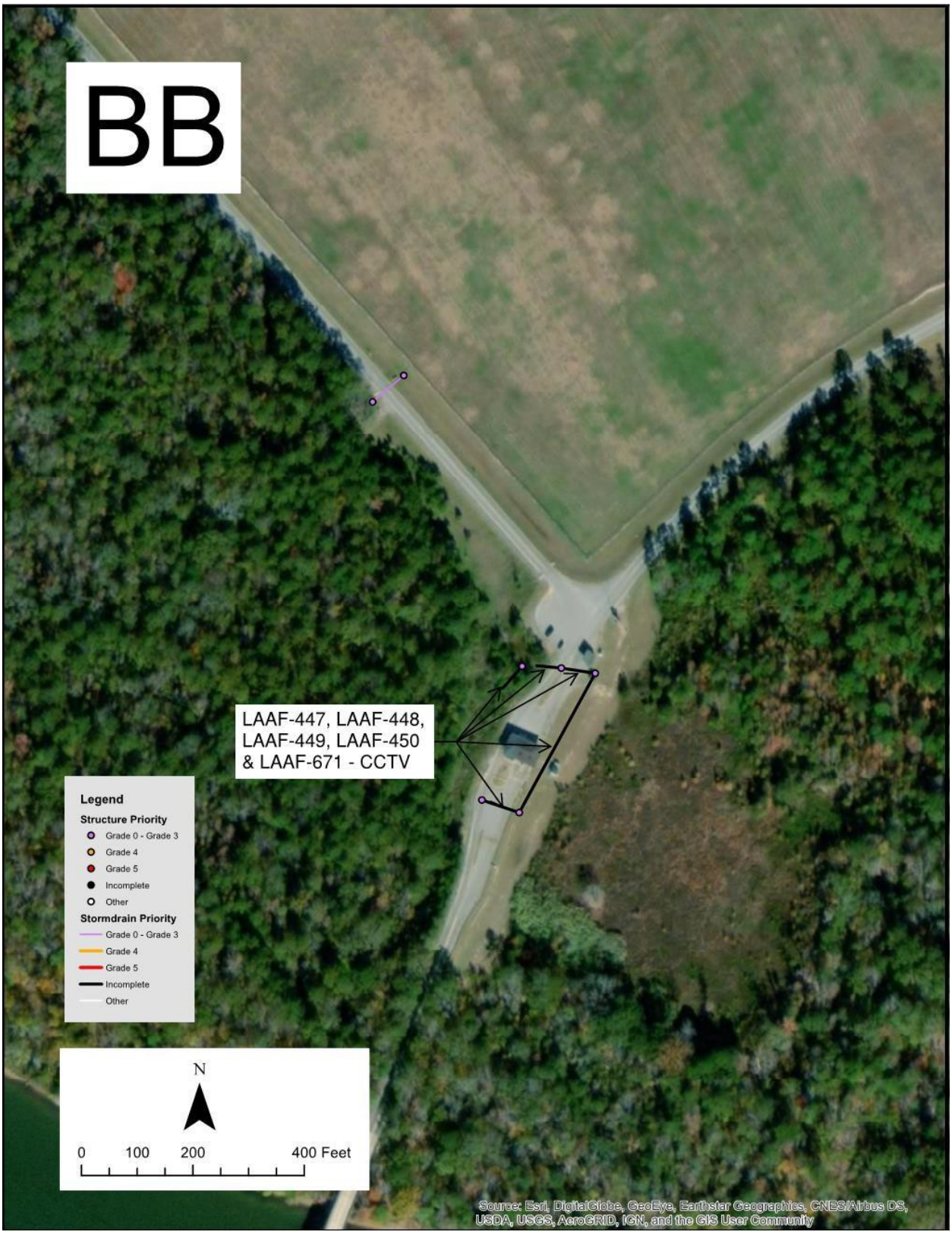

U
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
STRC-3194 - LINE
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

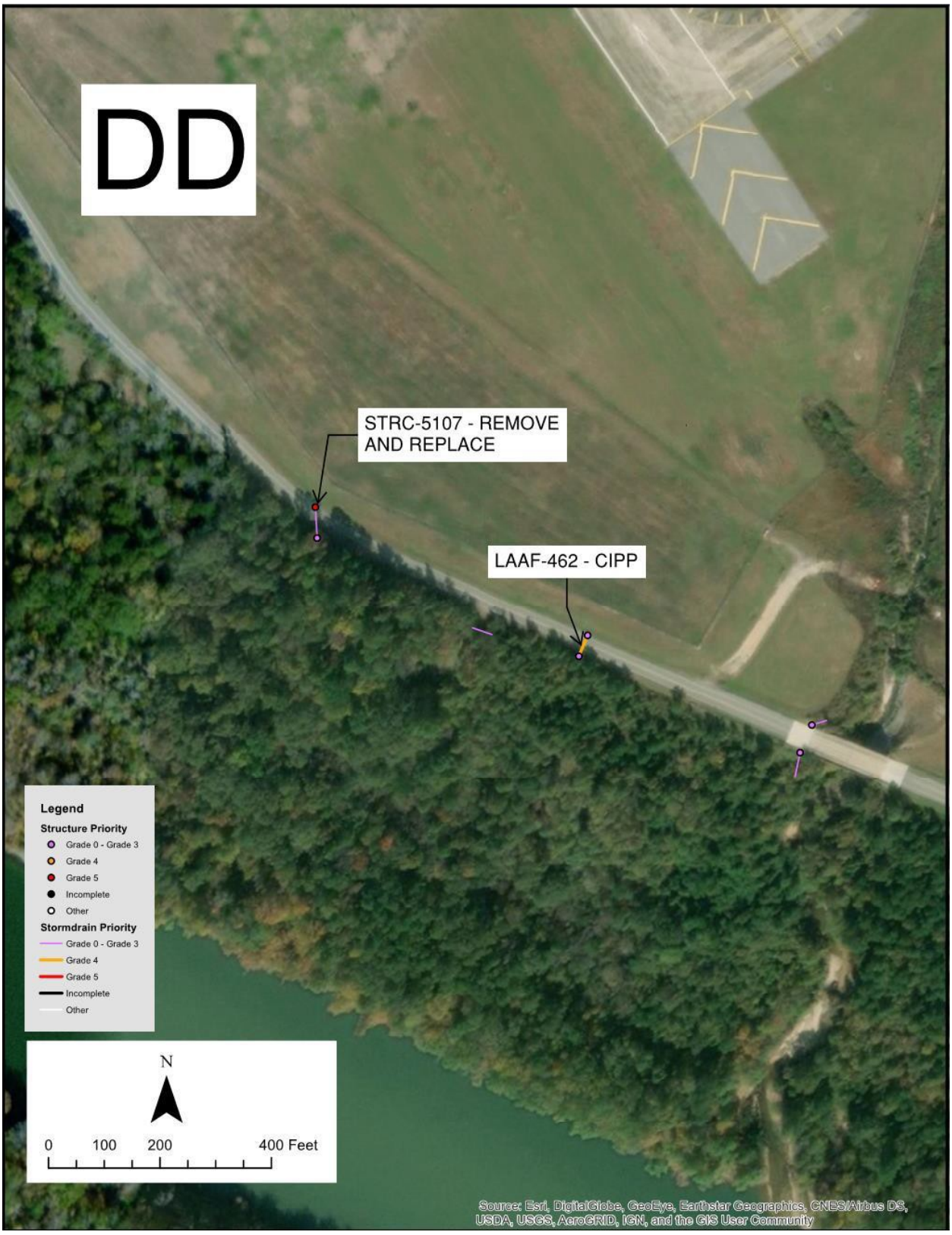

W
STRC-3151 -
REBUILD FLUME
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0
100
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

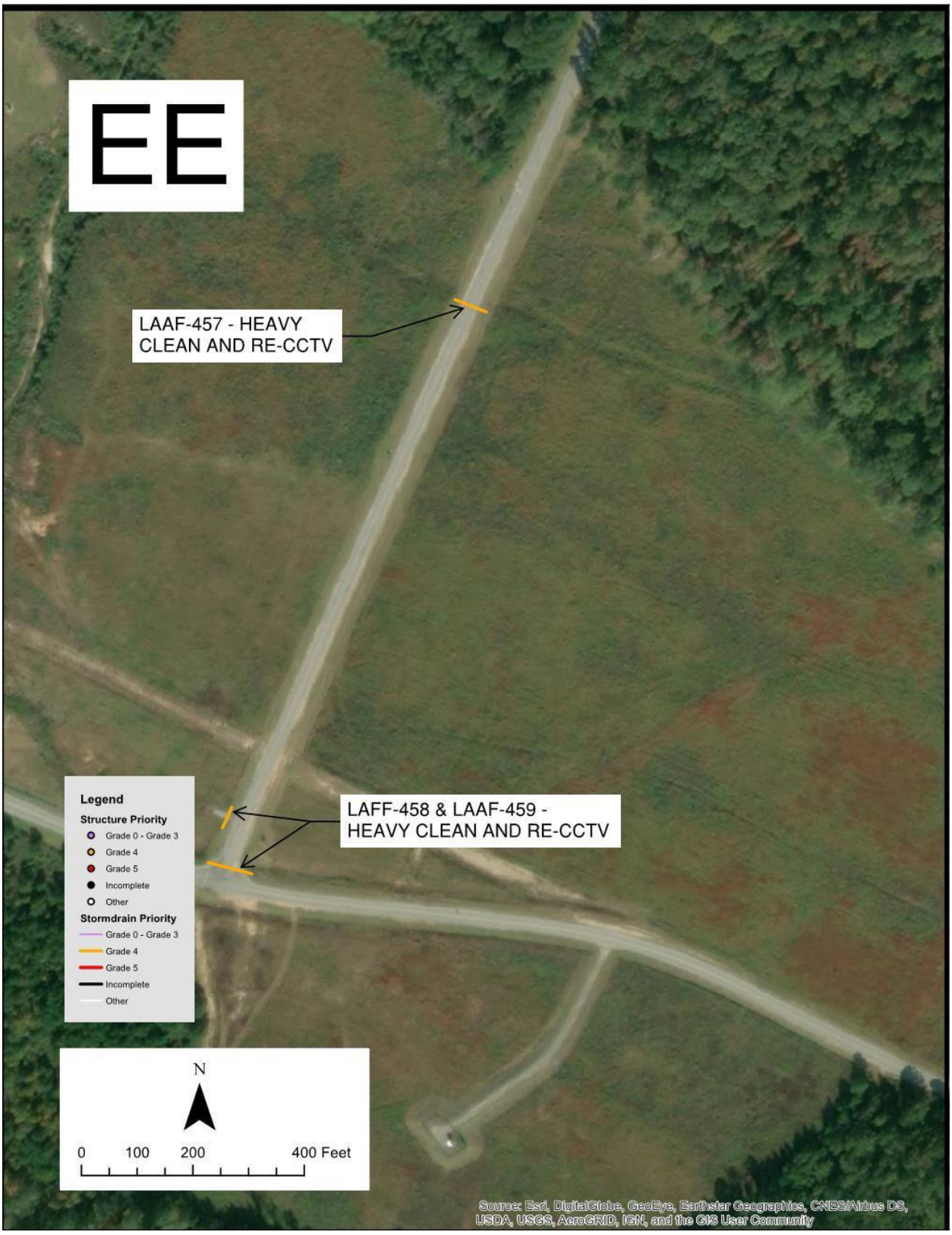

X
LAAF-186 - CIPP
LAAF-658 & LAAF-659 - HEAVY CLEAN AND RE-CCTV
LAAF-214 - SPRAYCAST
LAAF-200 & LAAF-201 - HEAVY CLEAN AND RE-CCTV
LAAF-265 - SPRAY CAST
STRC-3188 & STRC-3189 - ABANDON IN PLACE
LAAF-210 - UNCOVER OUTFALL AND HEAVY CLEAN
STRC-3347 & STRC-3348 - REMOVE SEDIMENT
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


STRC-3193 - LINE
Y
[redacted]
[redacted]
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0
100
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


AA
LAAF-452 - OPENCUT
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0
100
200
400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


BB
LAAF-447, LAAF-448,
LAAF-449, LAAF-450
& LAAF-671 - CCTV
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


DD
STRC-5107 - REMOVE AND REPLACE
LAAF-462 - CIPP
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


EE
LAAF-457 - HEAVY CLEAN AND RE-CCTV
LAFF-458 & LAAF-459 - HEAVY CLEAN AND RE-CCTV
Legend
Structure Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
Stormdrain Priority
Grade 0 - Grade 3
Grade 4
Grade 5
Incomplete
Other
N
0 100 200 400 Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community