REQUEST FOR PROPOSALS

A PROJECT TO PROVIDE A REPLACEMENT ROADSIDE TOLL COLLECTION SYSTEM FOR RIVERLINK'S OHIO RIVER BRIDGES

VOLUME III
REFERENCE INFORMATION DOCUMENTS

A PROJECT OF
THE INDIANA FINANCE AUTHORITY

ISSUED February 1, 2022

Indiana Finance Authority
One North Capitol Avenue, Suite 900
Indianapolis, Indiana 46204

TABLE OF CONTENTS

Section 1: Joint Board Authority

https://riverlink.com/about/joint-board/

Section 2: Agency Website References

Kentucky Public Transportation Infrastructure Authority: Louisville Bridges Project

https://transportation.ky.gov/KPTIA/Pages/default.aspx

INDOT Ohio River Bridges: Library

https://www.in.gov/indot/3696.htm

Section 3: Maintenance of Traffic Guidelines

INDOT Interstate Highways Congestion Policy

https://www.in.gov/indot/safety/work-zone-safety/interstate-highways-congestion-policy/

Indiana Design Manual

https://www.in.gov/dot/div/contracts/design/IDM.htm

Indiana Manual of Uniform Traffic Control Devices

https://www.in.gov/dot/div/contracts/design/mutcd/2011rev3MUTCD.htm

INDOT Standard Drawings

https://www.in.gov/dot/div/contracts/standards/drawings/sep21/sep.htm

KYTC Highway Design Guidance Manual

https://transportation.ky.gov/Organizational-Resources/Policy%20Manuals%20Library/Highway%20Design.pdf

KYTC Construction Guidance Manual

https://transportation.ky.gov/Construction/Documents/construction.pdf

Section 3: E-ZPass References

IAG Operating / Reciprocity Agreements and File Specifications

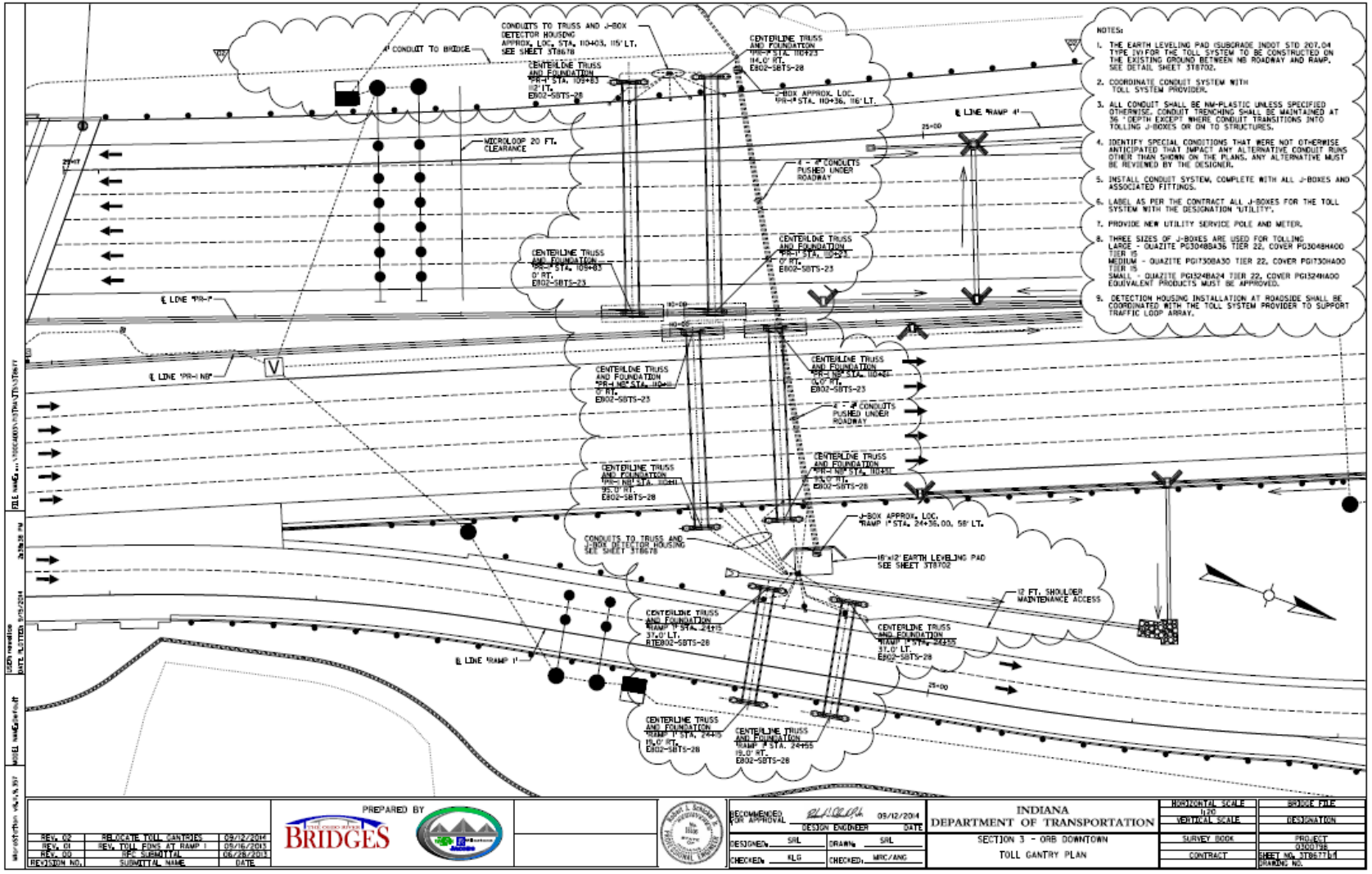
https://e-zpassiag.com/interoperability

Section 4: RTCS Diagrams and Images

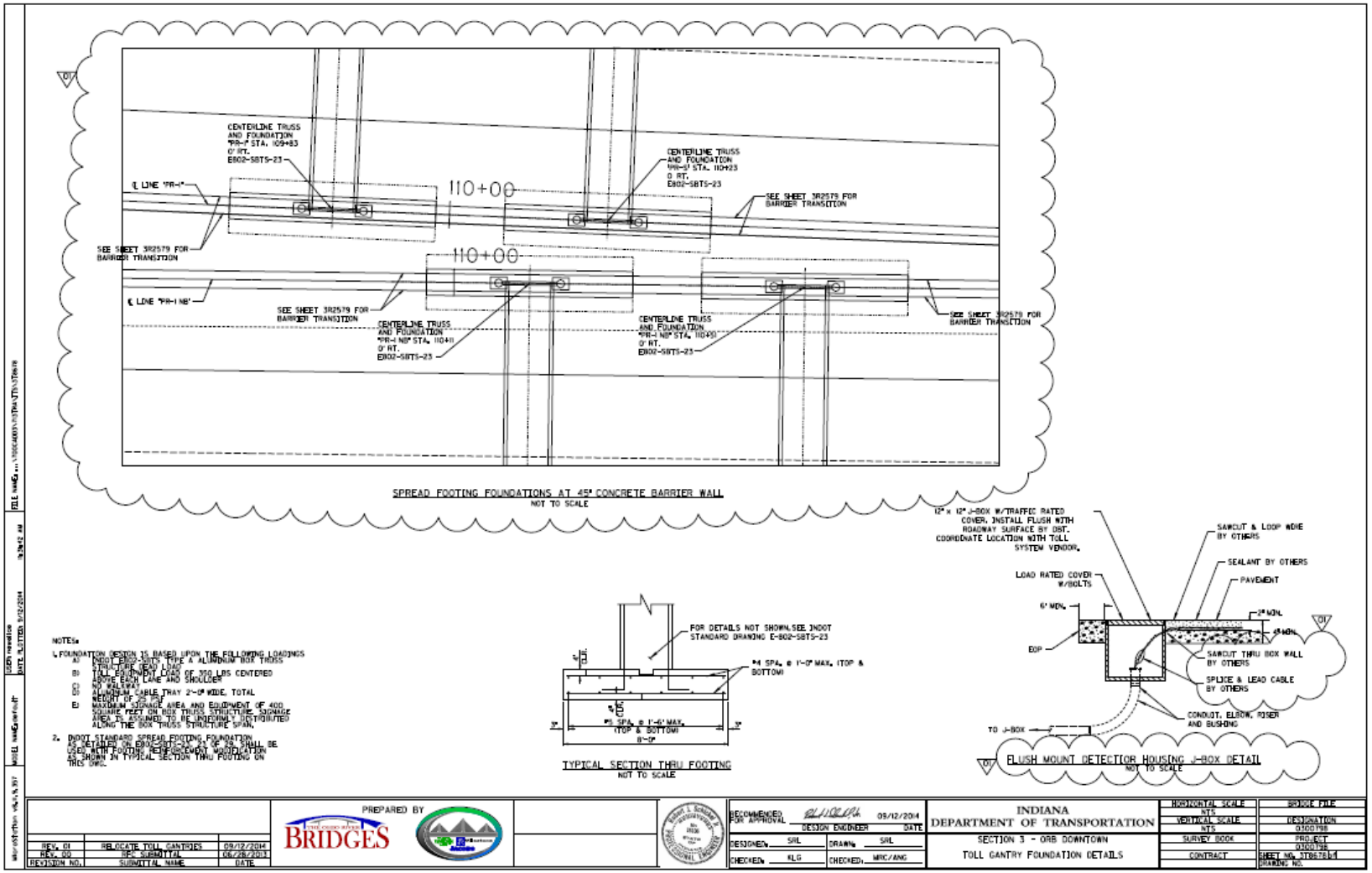
Current Roadside System Site Plans

THE MEASUREMENTS, LOCATIONS AND DIMENSIONS ON THE FOLLOWING DRAWINGS ARE APPROXIMATIONS ONLY AND SUCH MEASUREMENTS, LOCATIONS AND DIMENSIONS MAY NOT BE ACCURATE AND COMPLETE AND MAY NOT BE RELIED UPON.

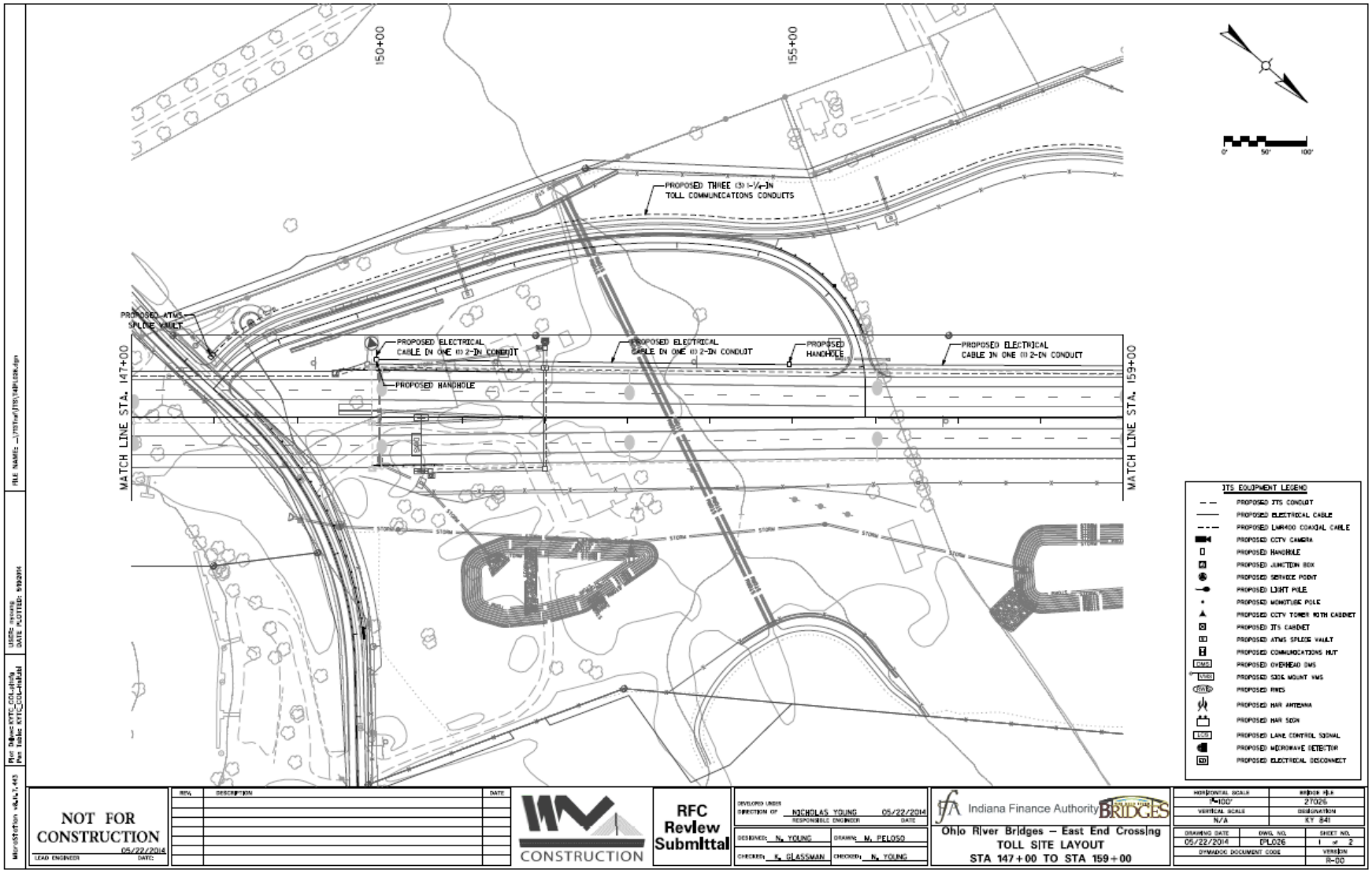
Downtown Crossing Project Sheet 1 of 2



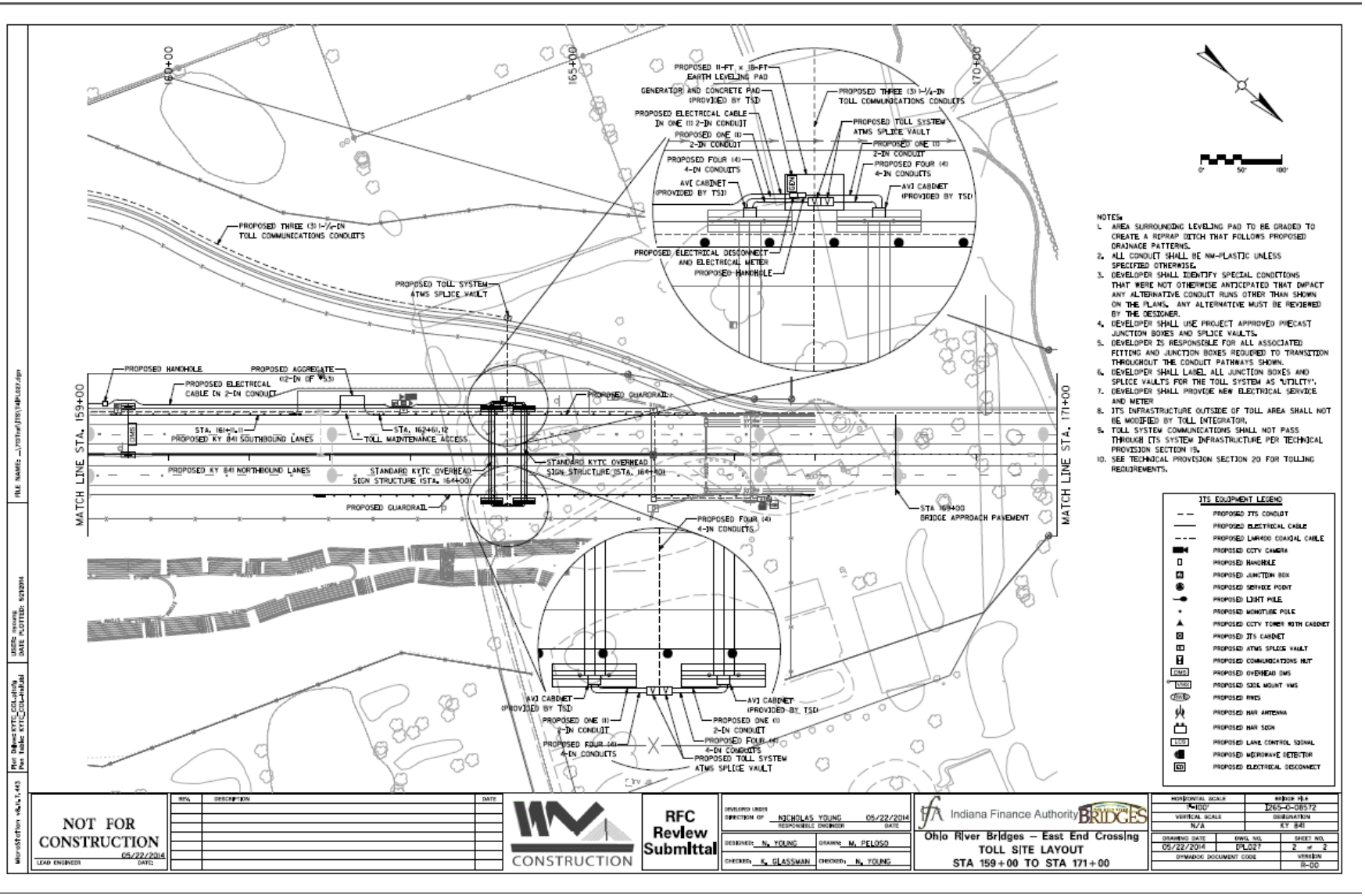
Downtown Crossing Project - Sheet 2 of 2



East End Crossing Project - Sheet 1 of 2

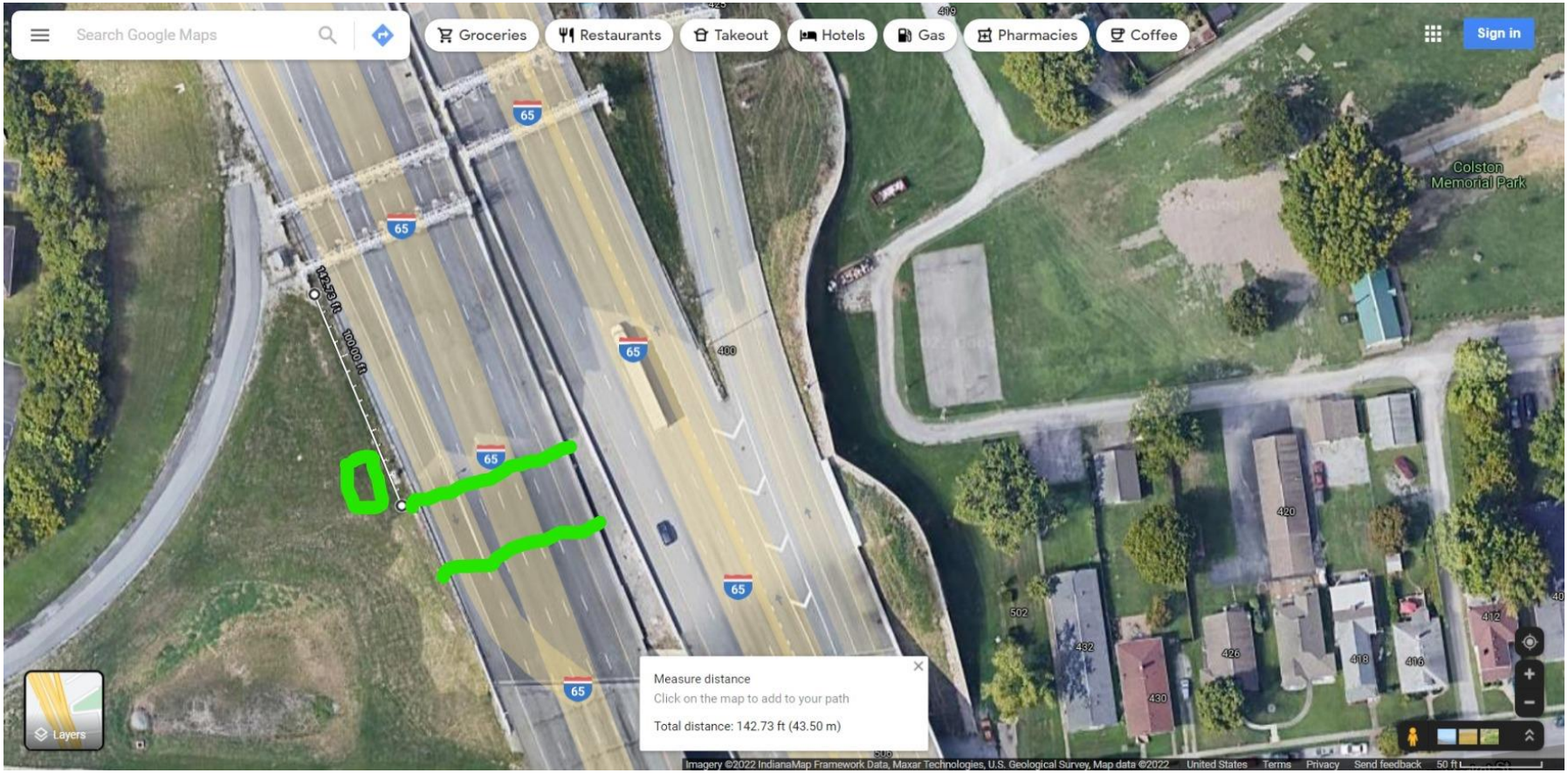


East End Crossing Project Sheet 2 of 2

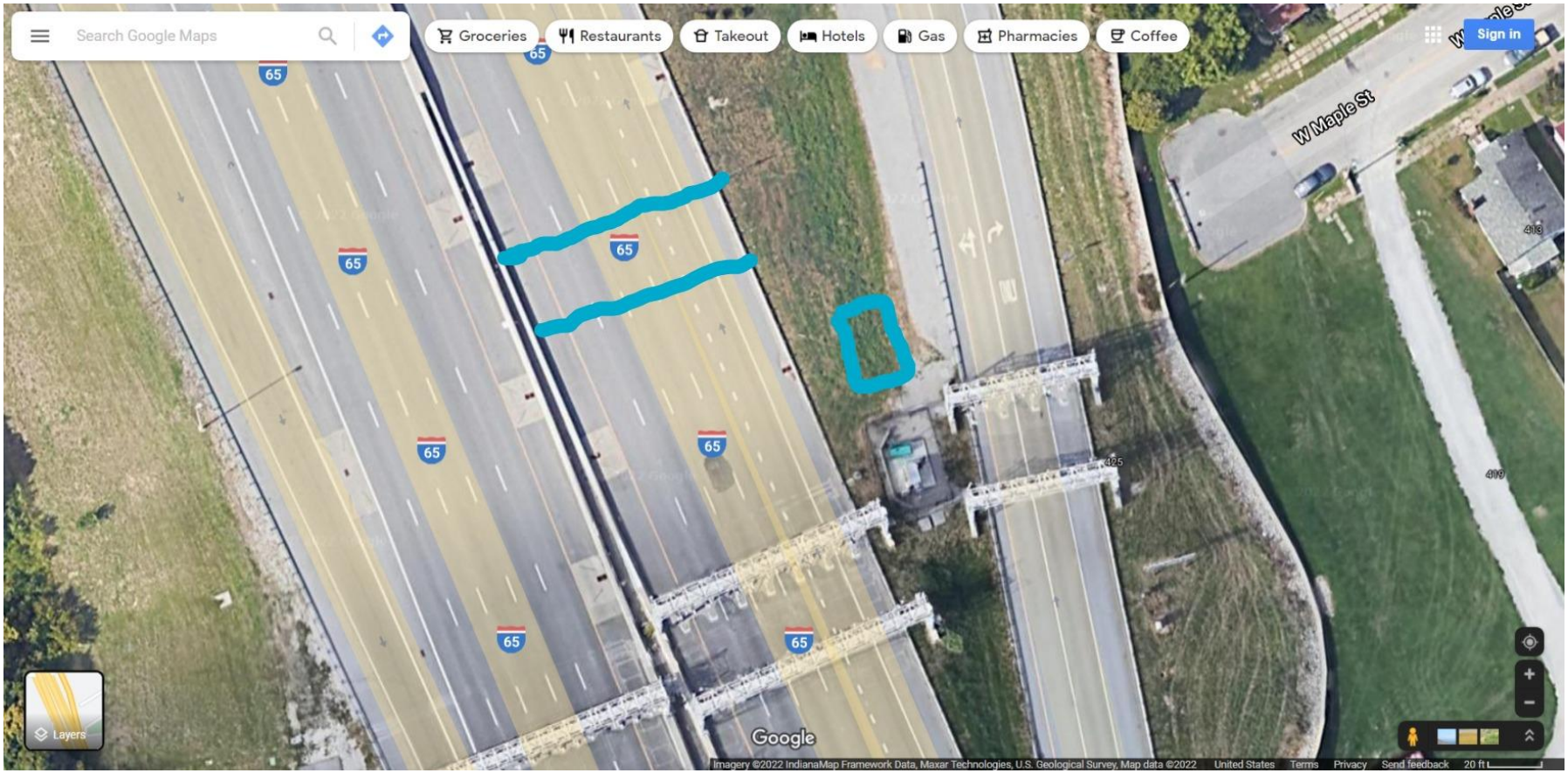


Proposed New Toll Zone Site Locations

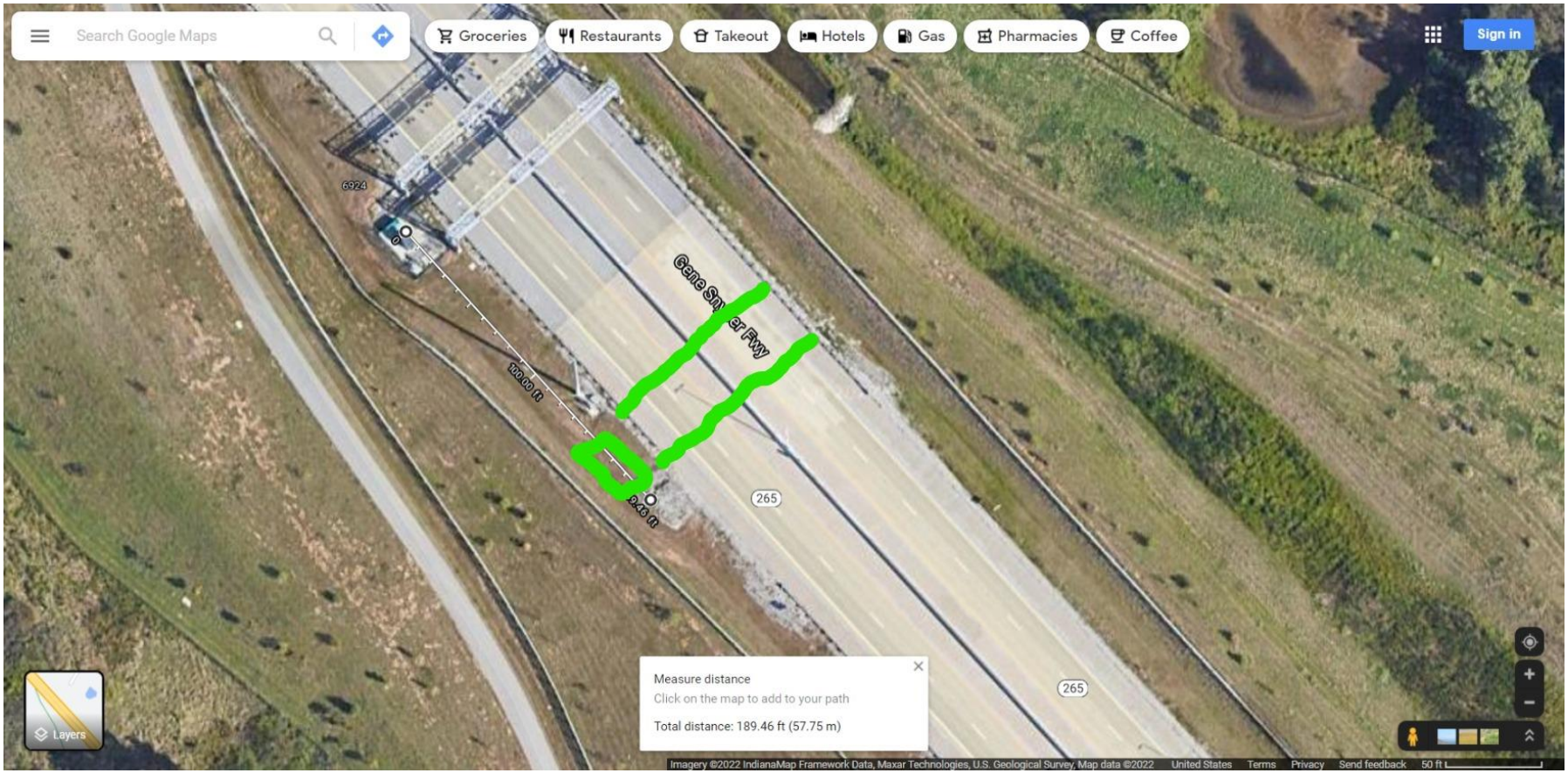
I-65 Southbound Downtown Louisville



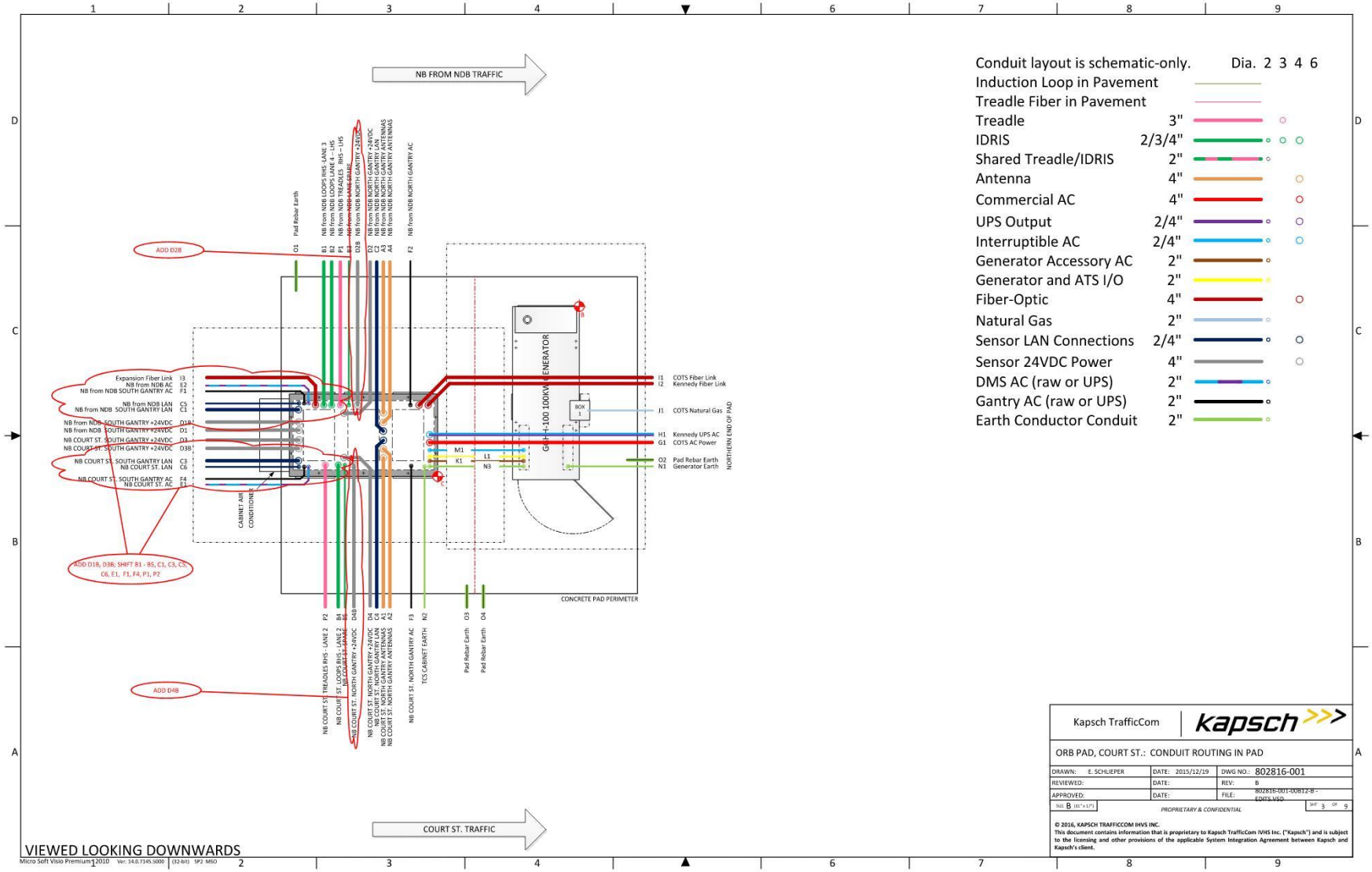
I-65 Northbound Downtown Louisville

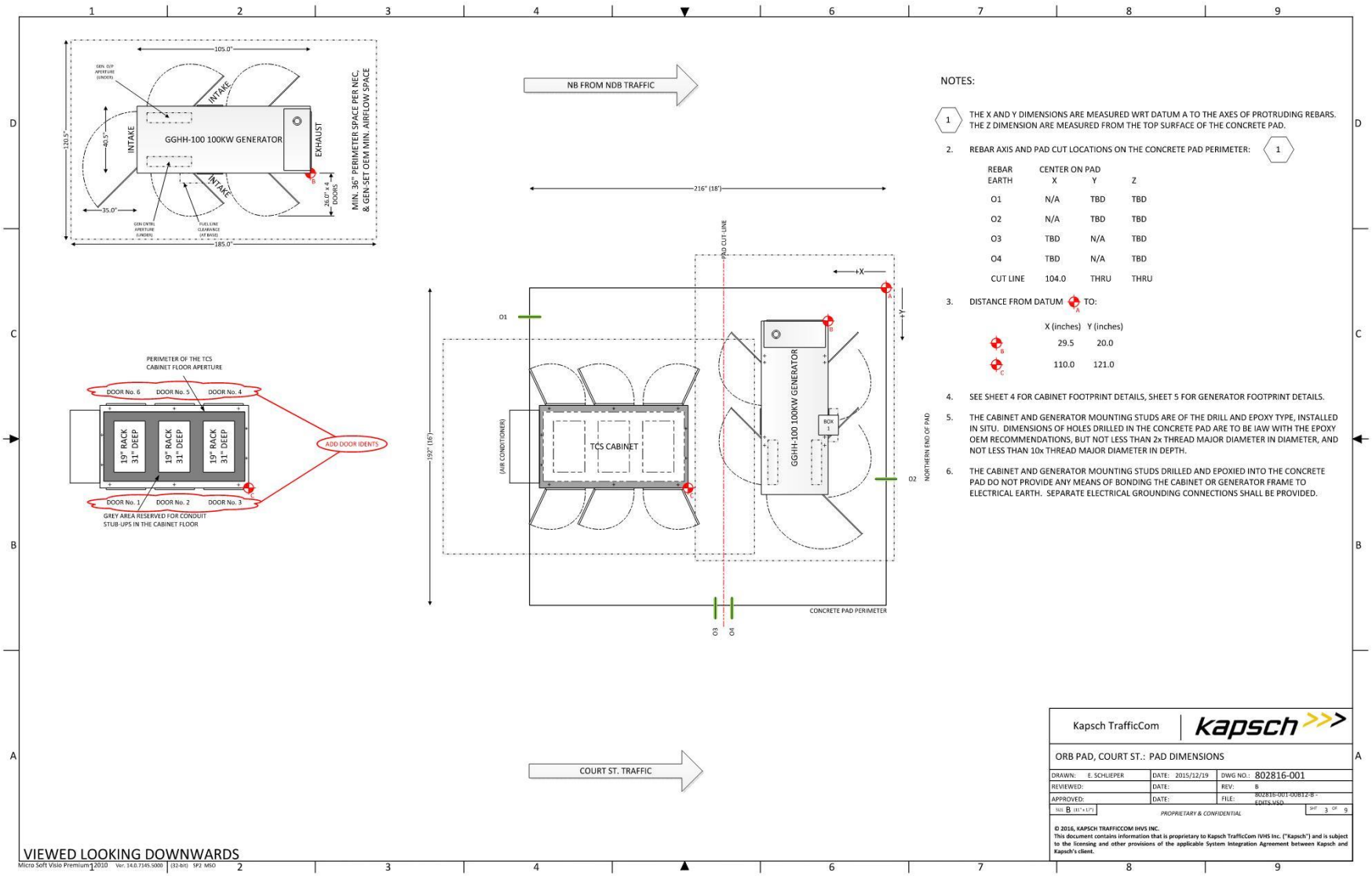


I-265 East End Crossing



Court Avenue Exit Ramp Conduit Drawings





NOTES:

1. THE X AND Y DIMENSIONS ARE MEASURED WRT DATUM A TO THE AXES OF PROTRUDING REBARS. THE Z DIMENSION ARE MEASURED FROM THE TOP SURFACE OF THE CONCRETE PAD.
2. REBAR AXIS AND PAD CUT LOCATIONS ON THE CONCRETE PAD PERIMETER: (1)

REBAR EARTH	CENTER ON PAD X	Y	Z
O1	N/A	TBD	TBD
O2	N/A	TBD	TBD
O3	TBD	N/A	TBD
O4	TBD	N/A	TBD
CUT LINE	104.0	THRU	THRU

3. DISTANCE FROM DATUM A TO:

	X (inches)	Y (inches)
B	29.5	20.0
C	110.0	121.0

4. SEE SHEET 4 FOR CABINET FOOTPRINT DETAILS, SHEET 5 FOR GENERATOR FOOTPRINT DETAILS.
5. THE CABINET AND GENERATOR MOUNTING STUDS ARE OF THE DRILL AND EPOXY TYPE, INSTALLED IN SITU. DIMENSIONS OF HOLES DRILLED IN THE CONCRETE PAD ARE TO BE IAW WITH THE EPOXY OEM RECOMMENDATIONS, BUT NOT LESS THAN 2x THREAD MAJOR DIAMETER IN DIAMETER, AND NOT LESS THAN 10x THREAD MAJOR DIAMETER IN DEPTH.
6. THE CABINET AND GENERATOR MOUNTING STUDS DRILLED AND EPOXIED INTO THE CONCRETE PAD DO NOT PROVIDE ANY MEANS OF BONDING THE CABINET OR GENERATOR FRAME TO ELECTRICAL EARTH. SEPARATE ELECTRICAL GROUNDING CONNECTIONS SHALL BE PROVIDED.

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ORB PAD, COURT ST.: PAD DIMENSIONS

DRAWN: E. SCHLIEPER	DATE: 2015/12/19	DWG NO.: 802816-001	
REVIEWED:	DATE:	REV: B	
APPROVED:	DATE:	FILE: 802816-001-00B12-B - EDITS.VSD	
SIZE B (11" x 17")	PROPRIETARY & CONFIDENTIAL	SHT 3 OF 9	

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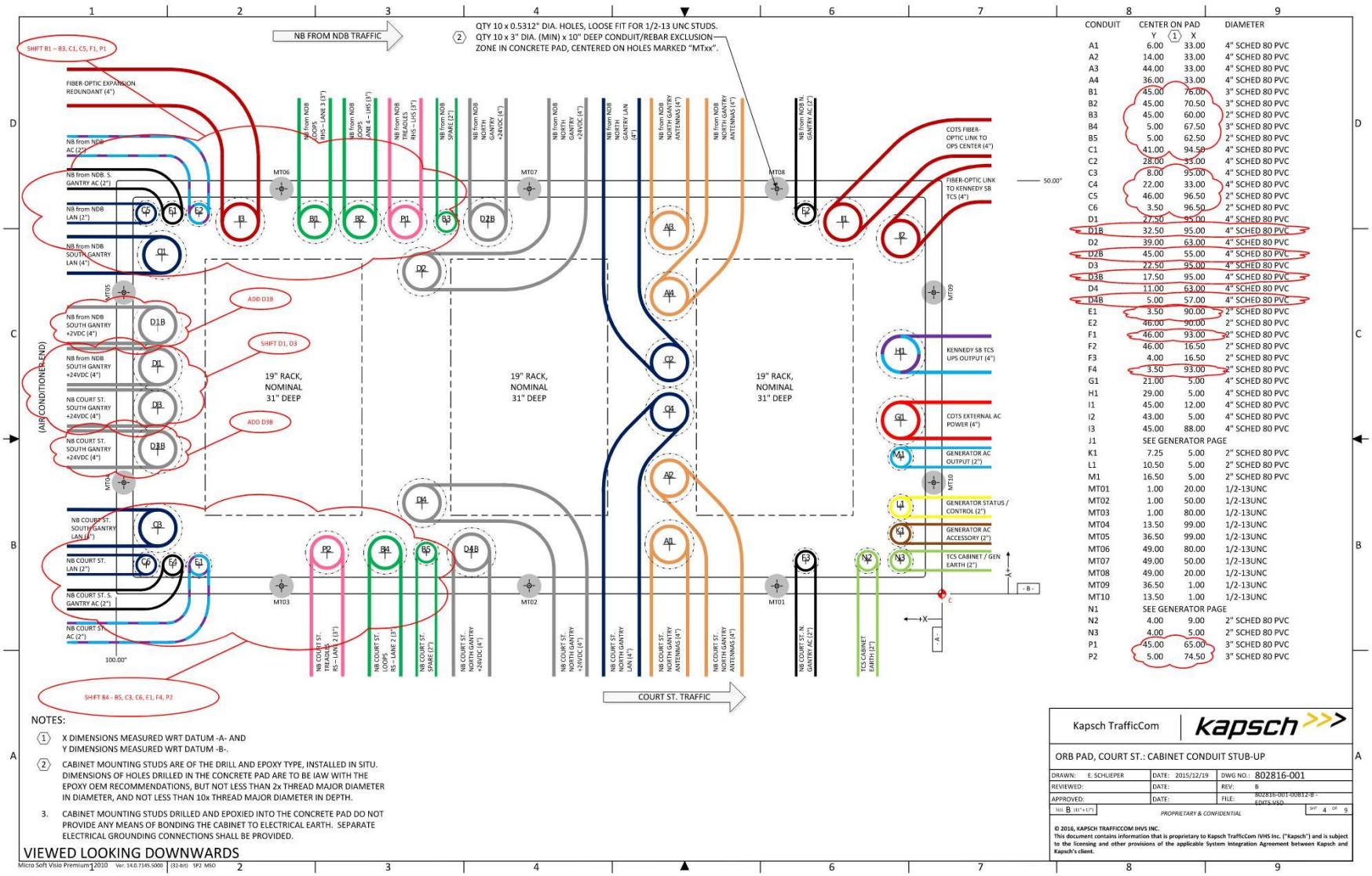

CONDUIT	CENTER ON PAD (1) Y	X	DIAMETER
A1	6.00	33.00	4" SCHED 80 PVC
A2	14.00	33.00	4" SCHED 80 PVC
A3	44.00	33.00	4" SCHED 80 PVC
A4	36.00	33.00	4" SCHED 80 PVC
B1	45.00	76.00	3" SCHED 80 PVC
B2	45.00	70.50	3" SCHED 80 PVC
B3	45.00	60.00	2" SCHED 80 PVC
B4	5.00	67.50	3" SCHED 80 PVC
B5	5.00	62.50	2" SCHED 80 PVC
C1	41.00	94.50	4" SCHED 80 PVC
C2	28.00	33.00	4" SCHED 80 PVC
C3	8.00	95.00	4" SCHED 80 PVC
C4	22.00	33.00	4" SCHED 80 PVC
C5	46.00	96.50	2" SCHED 80 PVC
C6	3.50	96.50	2" SCHED 80 PVC
D1	27.50	95.00	4" SCHED 80 PVC
D1B	32.50	95.00	4" SCHED 80 PVC
D2	39.00	63.00	4" SCHED 80 PVC
D2B	45.00	55.00	4" SCHED 80 PVC
D3	22.50	95.00	4" SCHED 80 PVC
D3B	17.50	95.00	4" SCHED 80 PVC
D4	11.00	63.00	4" SCHED 80 PVC
D4B	5.00	57.00	4" SCHED 80 PVC
E1	3.50	90.00	2" SCHED 80 PVC
E2	46.00	90.00	2" SCHED 80 PVC
F1	46.00	93.00	2" SCHED 80 PVC
F2	46.00	16.50	2" SCHED 80 PVC
F3	4.00	16.50	2" SCHED 80 PVC
F4	3.50	93.00	2" SCHED 80 PVC
G1	21.00	5.00	4" SCHED 80 PVC
H1	29.00	5.00	4" SCHED 80 PVC
I1	45.00	12.00	4" SCHED 80 PVC
I2	43.00	5.00	4" SCHED 80 PVC
I3	45.00	88.00	4" SCHED 80 PVC
J1	SEE GENERATOR PAGE		
K1	7.25	5.00	2" SCHED 80 PVC
L1	10.50	5.00	2" SCHED 80 PVC
M1	16.50	5.00	2" SCHED 80 PVC
MT01	1.00	20.00	1/2-13UNC
MT02	1.00	50.00	1/2-13UNC
MT03	1.00	80.00	1/2-13UNC
MT04	13.50	99.00	1/2-13UNC
MT05	36.50	99.00	1/2-13UNC
MT06	49.00	80.00	1/2-13UNC
MT07	49.00	50.00	1/2-13UNC
MT08	49.00	20.00	1/2-13UNC
MT09	36.50	1.00	1/2-13UNC
MT10	13.50	1.00	1/2-13UNC
N1	SEE GENERATOR PAGE		
N2	4.00	9.00	2" SCHED 80 PVC
N3	4.00	5.00	2" SCHED 80 PVC
P1	45.00	65.00	3" SCHED 80 PVC
P2	5.00	74.50	3" SCHED 80 PVC

NOTES:

(1) X DIMENSIONS MEASURED WRT DATUM -A- AND Y DIMENSIONS MEASURED WRT DATUM -B-.

(2) CABINET MOUNTING STUDS ARE OF THE DRILL AND EPOXY TYPE, INSTALLED IN SITU. DIMENSIONS OF HOLES DRILLED IN THE CONCRETE PAD ARE TO BE IAW WITH THE EPOXY OEM RECOMMENDATIONS, BUT NOT LESS THAN 2x THREAD MAJOR DIAMETER IN DIAMETER, AND NOT LESS THAN 10x THREAD MAJOR DIAMETER IN DEPTH.

3. CABINET MOUNTING STUDS DRILLED AND EPOXIED INTO THE CONCRETE PAD DO NOT PROVIDE ANY MEANS OF BONDING THE CABINET TO ELECTRICAL EARTH. SEPARATE ELECTRICAL GROUNDING CONNECTIONS SHALL BE PROVIDED.

VIEWED LOOKING DOWNWARDS

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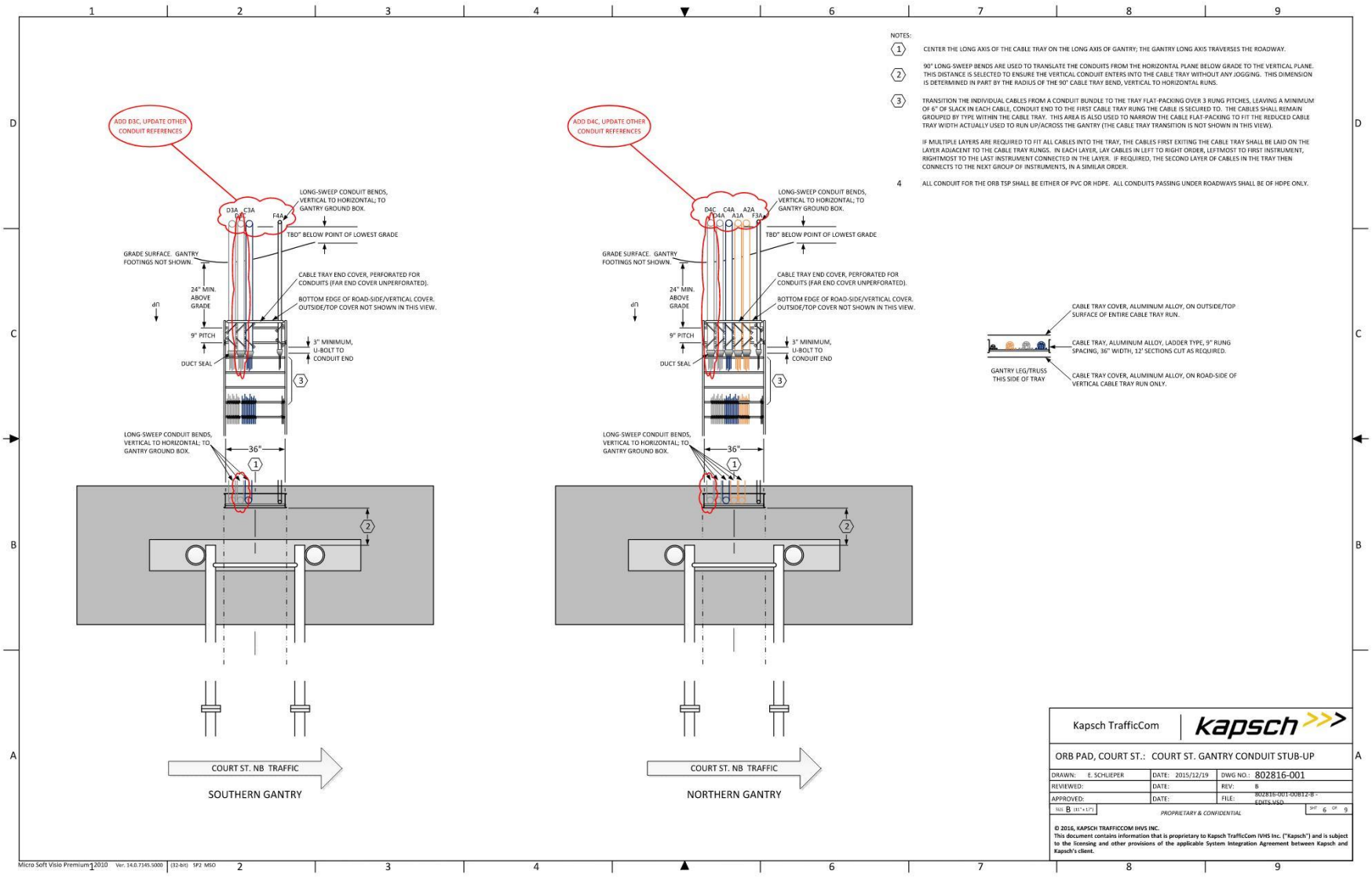
ORB PAD, COURT ST.: CABINET CONDUIT STUB-UP

DRAWN: E. SCHUEPER	DATE: 2015/12/19	DWG NO.: 802816-001	
REVIEWED:	DATE:	REV: B	
APPROVED:	DATE:	FILE: 802816-001-00B12-B - EDITS.VSD	
SIZE B (11" x 17")	PROPRIETARY & CONFIDENTIAL	SHT 4 OF 9	


NOTES:
1 CENTER THE LONG AXIS OF THE CABLE TRAY ON THE LONG AXIS OF GANTRY; THE GANTRY LONG AXIS TRAVERSES THE ROADWAY.
2 90° LONG-SWEEP BENDS ARE USED TO TRANSLATE THE CONDUITS FROM THE HORIZONTAL PLANE BELOW GRADE TO THE VERTICAL PLANE. THIS DISTANCE IS SELECTED TO ENSURE THE VERTICAL CONDUIT ENTERS INTO THE CABLE TRAY WITHOUT ANY JOGGING. THIS DIMENSION IS DETERMINED IN PART BY THE RADIUS OF THE 90° CABLE TRAY BEND, VERTICAL TO HORIZONTAL RUNS.
3 TRANSITION THE INDIVIDUAL CABLES FROM A CONDUIT BUNDLE TO THE TRAY FLAT-PACKING OVER 3 RUNG PITCHES, LEAVING A MINIMUM OF 6" OF SLACK IN EACH CABLE, CONDUIT END TO THE FIRST CABLE TRAY RUNG THE CABLE IS SECURED TO. THE CABLES SHALL REMAIN GROUPED BY TYPE WITHIN THE CABLE TRAY. THIS AREA IS ALSO USED TO NARROW THE CABLE FLAT-PACKING TO FIT THE REDUCED CABLE TRAY WIDTH ACTUALLY USED TO RUN UP/ACROSS THE GANTRY (THE CABLE TRAY TRANSITION IS NOT SHOWN IN THIS VIEW).
IF MULTIPLE LAYERS ARE REQUIRED TO FIT ALL CABLES INTO THE TRAY, THE CABLES FIRST EXITING THE CABLE TRAY SHALL BE LAID ON THE LAYER ADJACENT TO THE CABLE TRAY RUNGS. IN EACH LAYER, LAY CABLES IN LEFT TO RIGHT ORDER, LEFTMOST TO FIRST INSTRUMENT, RIGHTMOST TO THE LAST INSTRUMENT CONNECTED IN THE LAYER. IF REQUIRED, THE SECOND LAYER OF CABLES IN THE TRAY THEN CONNECTS TO THE NEXT GROUP OF INSTRUMENTS, IN A SIMILAR ORDER.
4 ALL CONDUIT FOR THE ORB TSP SHALL BE EITHER OF PVC OR HDPE. ALL CONDUITS PASSING UNDER ROADWAYS SHALL BE OF HDPE ONLY.
ADD D3C, UPDATE OTHER CONDUIT REFERENCES
D3A C3A D4A F4A
LONG-SWEEP CONDUIT BENDS, VERTICAL TO HORIZONTAL; TO GANTRY GROUND BOX.
TBD" BELOW POINT OF LOWEST GRADE
GRADE SURFACE. GANTRY FOOTINGS NOT SHOWN.
24" MIN. ABOVE GRADE
CABLE TRAY END COVER, PERFORATED FOR CONDUITS (FAR END COVER UNPERFORATED).
BOTTOM EDGE OF ROAD-SIDE/VERTICAL COVER. OUTSIDE/TOP COVER NOT SHOWN IN THIS VIEW.
9" PITCH
3" MINIMUM, U-BOLT TO CONDUIT END
DUCT SEAL
36"
COURT ST. NB TRAFFIC
SOUTHERN GANTRY
ADD D4C, UPDATE OTHER CONDUIT REFERENCES
D4C C4A A2A D4A A1A F3A
NORTHERN GANTRY
CABLE TRAY COVER, ALUMINUM ALLOY, ON OUTSIDE/TOP SURFACE OF ENTIRE CABLE TRAY RUN.
CABLE TRAY, ALUMINUM ALLOY, LADDER TYPE, 9" RUNG SPACING, 36" WIDTH, 12' SECTIONS CUT AS REQUIRED.
GANTRY LEG/TRUSS THIS SIDE OF TRAY
CABLE TRAY COVER, ALUMINUM ALLOY, ON ROAD-SIDE OF VERTICAL CABLE TRAY RUN ONLY.
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ORB PAD, COURT ST.: COURT ST. GANTRY CONDUIT STUB-UP
DRAWN: E. SCHLIEPER
DATE: 2015/12/19
DWG NO.: 802816-001
REVIEWED:
DATE:
REV: B
APPROVED:
DATE:
FILE: 802816-001-00B12-B - EDITS.VSD
SIZE B (11" x 17")
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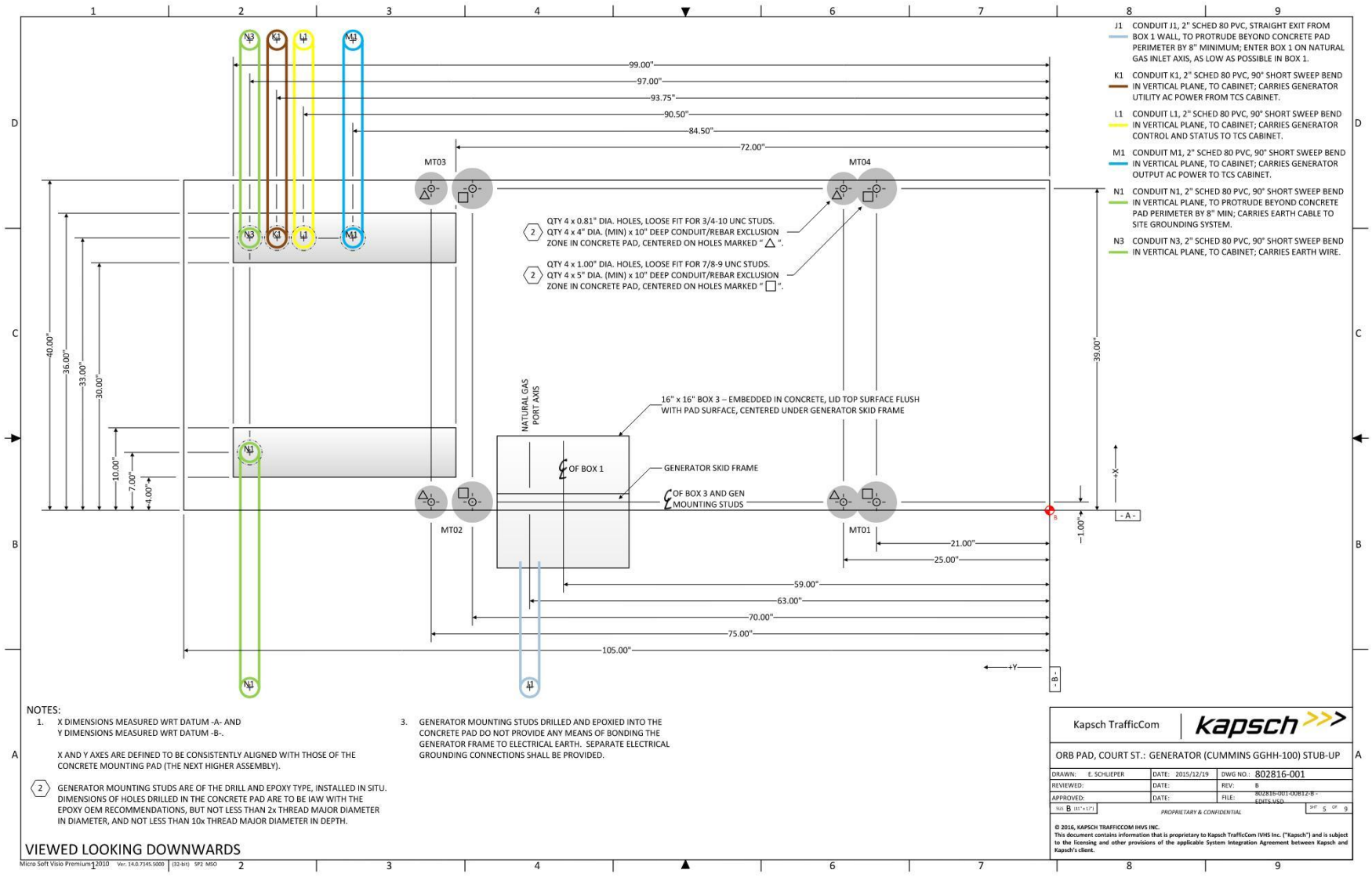
J1 CONDUIT J1, 2" SCHED 80 PVC, STRAIGHT EXIT FROM BOX 1 WALL, TO PROTRUDE BEYOND CONCRETE PAD PERIMETER BY 8" MINIMUM; ENTER BOX 1 ON NATURAL GAS INLET AXIS, AS LOW AS POSSIBLE IN BOX 1.
K1 CONDUIT K1, 2" SCHED 80 PVC, 90° SHORT SWEEP BEND IN VERTICAL PLANE, TO CABINET; CARRIES GENERATOR UTILITY AC POWER FROM TCS CABINET.
L1 CONDUIT L1, 2" SCHED 80 PVC, 90° SHORT SWEEP BEND IN VERTICAL PLANE, TO CABINET; CARRIES GENERATOR CONTROL AND STATUS TO TCS CABINET.
M1 CONDUIT M1, 2" SCHED 80 PVC, 90° SHORT SWEEP BEND IN VERTICAL PLANE, TO CABINET; CARRIES GENERATOR OUTPUT AC POWER TO TCS CABINET.
N1 CONDUIT N1, 2" SCHED 80 PVC, 90° SHORT SWEEP BEND IN VERTICAL PLANE, TO PROTRUDE BEYOND CONCRETE PAD PERIMETER BY 8" MIN; CARRIES EARTH CABLE TO SITE GROUNDING SYSTEM.
N3 CONDUIT N3, 2" SCHED 80 PVC, 90° SHORT SWEEP BEND IN VERTICAL PLANE, TO CABINET; CARRIES EARTH WIRE.
99.00"
97.00"
93.75"
90.50"
84.50"
72.00"
MT03
MT04
2 QTY 4 x 0.81" DIA. HOLES, LOOSE FIT FOR 3/4-10 UNC STUDS. QTY 4 x 4" DIA. (MIN) x 10" DEEP CONDUIT/REBAR EXCLUSION ZONE IN CONCRETE PAD, CENTERED ON HOLES MARKED " △ ".
2 QTY 4 x 1.00" DIA. HOLES, LOOSE FIT FOR 7/8-9 UNC STUDS. QTY 4 x 5" DIA. (MIN) x 10" DEEP CONDUIT/REBAR EXCLUSION ZONE IN CONCRETE PAD, CENTERED ON HOLES MARKED " □ ".
40.00"
36.00"
33.00"
30.00"
10.00"
7.00"
4.00"
39.00"
+X
- A -
1.00"
NATURAL GAS PORT AXIS
16" x 16" BOX 3 – EMBEDDED IN CONCRETE, LID TOP SURFACE FLUSH WITH PAD SURFACE, CENTERED UNDER GENERATOR SKID FRAME
℄ OF BOX 1
GENERATOR SKID FRAME
℄ OF BOX 3 AND GEN MOUNTING STUDS
MT02
MT01
21.00"
25.00"
59.00"
63.00"
70.00"
75.00"
105.00"
+Y
- B -
NOTES:
1. X DIMENSIONS MEASURED WRT DATUM -A- AND Y DIMENSIONS MEASURED WRT DATUM -B-.
X AND Y AXES ARE DEFINED TO BE CONSISTENTLY ALIGNED WITH THOSE OF THE CONCRETE MOUNTING PAD (THE NEXT HIGHER ASSEMBLY).
2 GENERATOR MOUNTING STUDS ARE OF THE DRILL AND EPOXY TYPE, INSTALLED IN SITU. DIMENSIONS OF HOLES DRILLED IN THE CONCRETE PAD ARE TO BE IAW WITH THE EPOXY OEM RECOMMENDATIONS, BUT NOT LESS THAN 2x THREAD MAJOR DIAMETER IN DIAMETER, AND NOT LESS THAN 10x THREAD MAJOR DIAMETER IN DEPTH.
3. GENERATOR MOUNTING STUDS DRILLED AND EPOXIED INTO THE CONCRETE PAD DO NOT PROVIDE ANY MEANS OF BONDING THE GENERATOR FRAME TO ELECTRICAL EARTH. SEPARATE ELECTRICAL GROUNDING CONNECTIONS SHALL BE PROVIDED.
VIEWED LOOKING DOWNWARDS
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ORB PAD, COURT ST.: GENERATOR (CUMMINS GGHH-100) STUB-UP
DRAWN: E. SCHLIEPER
DATE: 2015/12/19
DWG NO.: 802816-001
REVIEWED:
DATE:
REV: B
APPROVED:
DATE:
FILE: 802816-001-00B12-B - EDITS.VSD
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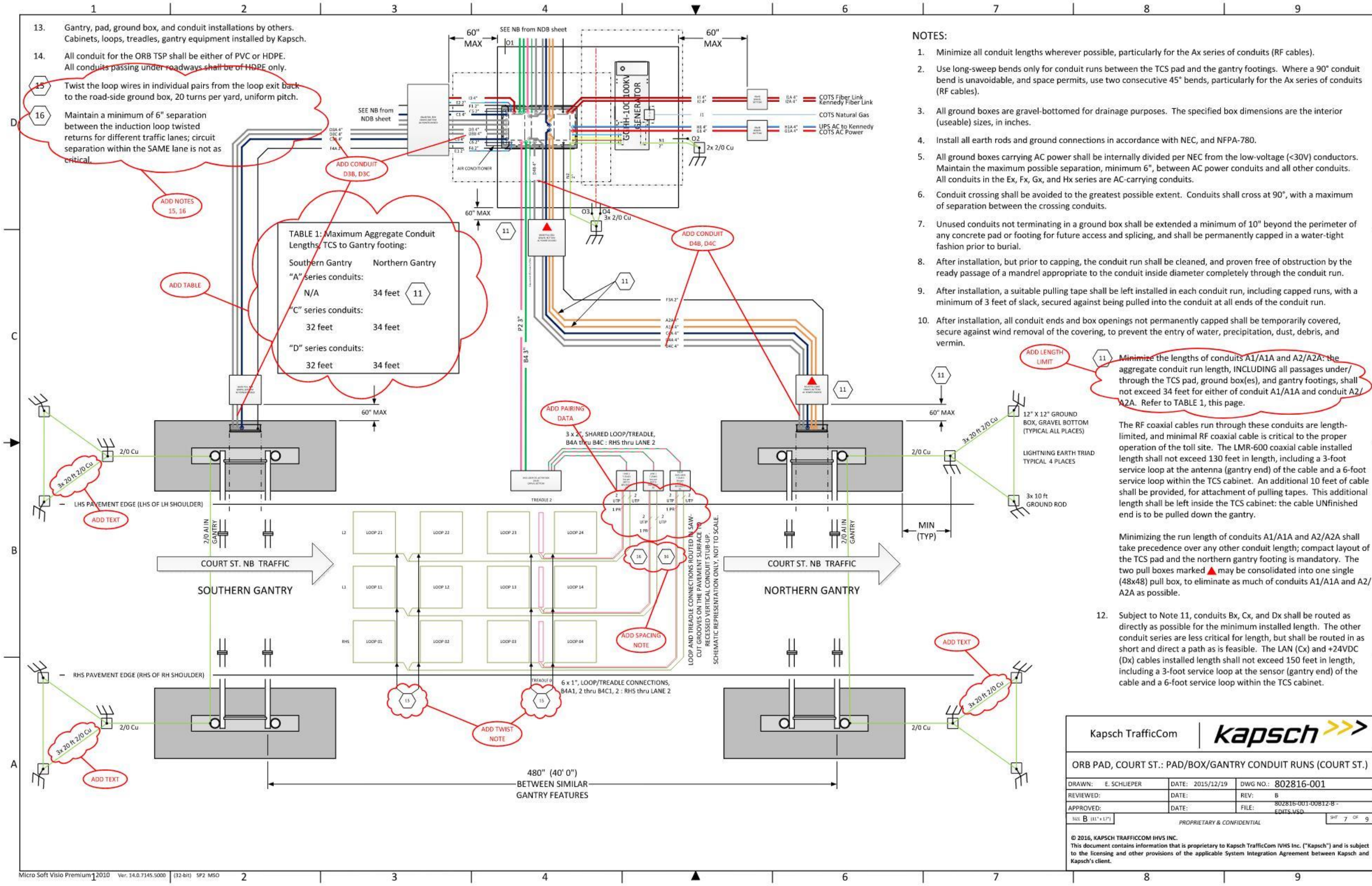
13. Gantry, pad, ground box, and conduit installations by others. Cabinets, loops, treadles, gantry equipment installed by Kapsch.
14. All conduit for the ORB TSP shall be either of PVC or HDPE. All conduits passing under roadways shall be of HDPE only.
15 Twist the loop wires in individual pairs from the loop exit back to the road-side ground box, 20 turns per yard, uniform pitch.
16 Maintain a minimum of 6" separation between the induction loop twisted returns for different traffic lanes; circuit separation within the SAME lane is not as critical.
ADD NOTES 15, 16
ADD CONDUIT D3B, D3C
ADD CONDUIT D4B, D4C
ADD TABLE
TABLE 1: Maximum Aggregate Conduit Lengths, TCS to Gantry footing:
Southern Gantry / Northern Gantry
"A" series conduits: N/A / 34 feet
"C" series conduits: 32 feet / 34 feet
"D" series conduits: 32 feet / 34 feet
60" MAX
SEE NB from NDB sheet
SEE NB from NDB sheet
GCHH-100 100KV GENERATOR
COTS Fiber Link Kennedy Fiber Link
COTS Natural Gas
UPS AC to Kennedy COTS AC Power
2x 2/0 Cu
3x 2/0 Cu
AIR CONDITIONER
P2 3"
B4 3"
ADD PAIRING DATA
3 x 2C SHARED LOOP/TREADLE, B4A thru B4C : RHS thru LANE 2
TREADLE 2
2/0 Cu
3x 20 ft 2/0 Cu
LHS PAVEMENT EDGE (LHS OF LH SHOULDER)
RHS PAVEMENT EDGE (RHS OF RH SHOULDER)
ADD TEXT
2/0 AI IN GANTRY
COURT ST. NB TRAFFIC
SOUTHERN GANTRY
NORTHERN GANTRY
LOOP 21 LOOP 22 LOOP 23 LOOP 24
LOOP 11 LOOP 12 LOOP 13 LOOP 14
LOOP 01 LOOP 02 LOOP 03 LOOP 04
LOOP AND TREADLE CONNECTIONS ROUTED IN SAW-CUT GROOVES ON THE PAVEMENT SURFACE TO RECESSED VERTICAL CONDUIT STUB-UP. SCHEMATIC REPRESENTATION ONLY, NOT TO SCALE.
ADD SPACING NOTE
6 x 1", LOOP/TREADLE CONNECTIONS, B4A1, 2 thru B4C1, 2 : RHS thru LANE 2
ADD TWIST NOTE
MIN (TYP)
480" (40' 0") BETWEEN SIMILAR GANTRY FEATURES
12" X 12" GROUND BOX, GRAVEL BOTTOM (TYPICAL ALL PLACES)
LIGHTNING EARTH TRIAD TYPICAL 4 PLACES
3x 10 ft GROUND ROD
NOTES:
1. Minimize all conduit lengths wherever possible, particularly for the Ax series of conduits (RF cables).
2. Use long-sweep bends only for conduit runs between the TCS pad and the gantry footings. Where a 90° conduit bend is unavoidable, and space permits, use two consecutive 45° bends, particularly for the Ax series of conduits (RF cables).
3. All ground boxes are gravel-bottomed for drainage purposes. The specified box dimensions are the interior (useable) sizes, in inches.
4. Install all earth rods and ground connections in accordance with NEC, and NFPA-780.
5. All ground boxes carrying AC power shall be internally divided per NEC from the low-voltage (<30V) conductors. Maintain the maximum possible separation, minimum 6", between AC power conduits and all other conduits. All conduits in the Ex, Fx, Gx, and Hx series are AC-carrying conduits.
6. Conduit crossing shall be avoided to the greatest possible extent. Conduits shall cross at 90°, with a maximum of separation between the crossing conduits.
7. Unused conduits not terminating in a ground box shall be extended a minimum of 10" beyond the perimeter of any concrete pad or footing for future access and splicing, and shall be permanently capped in a water-tight fashion prior to burial.
8. After installation, but prior to capping, the conduit run shall be cleaned, and proven free of obstruction by the ready passage of a mandrel appropriate to the conduit inside diameter completely through the conduit run.
9. After installation, a suitable pulling tape shall be left installed in each conduit run, including capped runs, with a minimum of 3 feet of slack, secured against being pulled into the conduit at all ends of the conduit run.
10. After installation, all conduit ends and box openings not permanently capped shall be temporarily covered, secure against wind removal of the covering, to prevent the entry of water, precipitation, dust, debris, and vermin.
ADD LENGTH LIMIT
11 Minimize the lengths of conduits A1/A1A and A2/A2A: the aggregate conduit run length, INCLUDING all passages under/through the TCS pad, ground box(es), and gantry footings, shall not exceed 34 feet for either of conduit A1/A1A and conduit A2/A2A. Refer to TABLE 1, this page.
The RF coaxial cables run through these conduits are length-limited, and minimal RF coaxial cable is critical to the proper operation of the toll site. The LMR-600 coaxial cable installed length shall not exceed 130 feet in length, including a 3-foot service loop at the antenna (gantry end) of the cable and a 6-foot service loop within the TCS cabinet. An additional 10 feet of cable shall be provided, for attachment of pulling tapes. This additional length shall be left inside the TCS cabinet: the cable UNfinished end is to be pulled down the gantry.
Minimizing the run length of conduits A1/A1A and A2/A2A shall take precedence over any other conduit length; compact layout of the TCS pad and the northern gantry footing is mandatory. The two pull boxes marked ▲ may be consolidated into one single (48x48) pull box, to eliminate as much of conduits A1/A1A and A2/A2A as possible.
12. Subject to Note 11, conduits Bx, Cx, and Dx shall be routed as directly as possible for the minimum installed length. The other conduit series are less critical for length, but shall be routed in as short and direct a path as is feasible. The LAN (Cx) and +24VDC (Dx) cables installed length shall not exceed 150 feet in length, including a 3-foot service loop at the sensor (gantry end) of the cable and a 6-foot service loop within the TCS cabinet.
Kapsch TrafficCom kapsch
ORB PAD, COURT ST.: PAD/BOX/GANTRY CONDUIT RUNS (COURT ST.)
DRAWN: E. SCHLIEPER DATE: 2015/12/19 DWG NO.: 802816-001
REVIEWED: DATE: REV: B
APPROVED: DATE: FILE: 802816-001-00812-B-EDITS.VSD
SHT 7 OF 9
PROPRIETARY & CONFIDENTIAL
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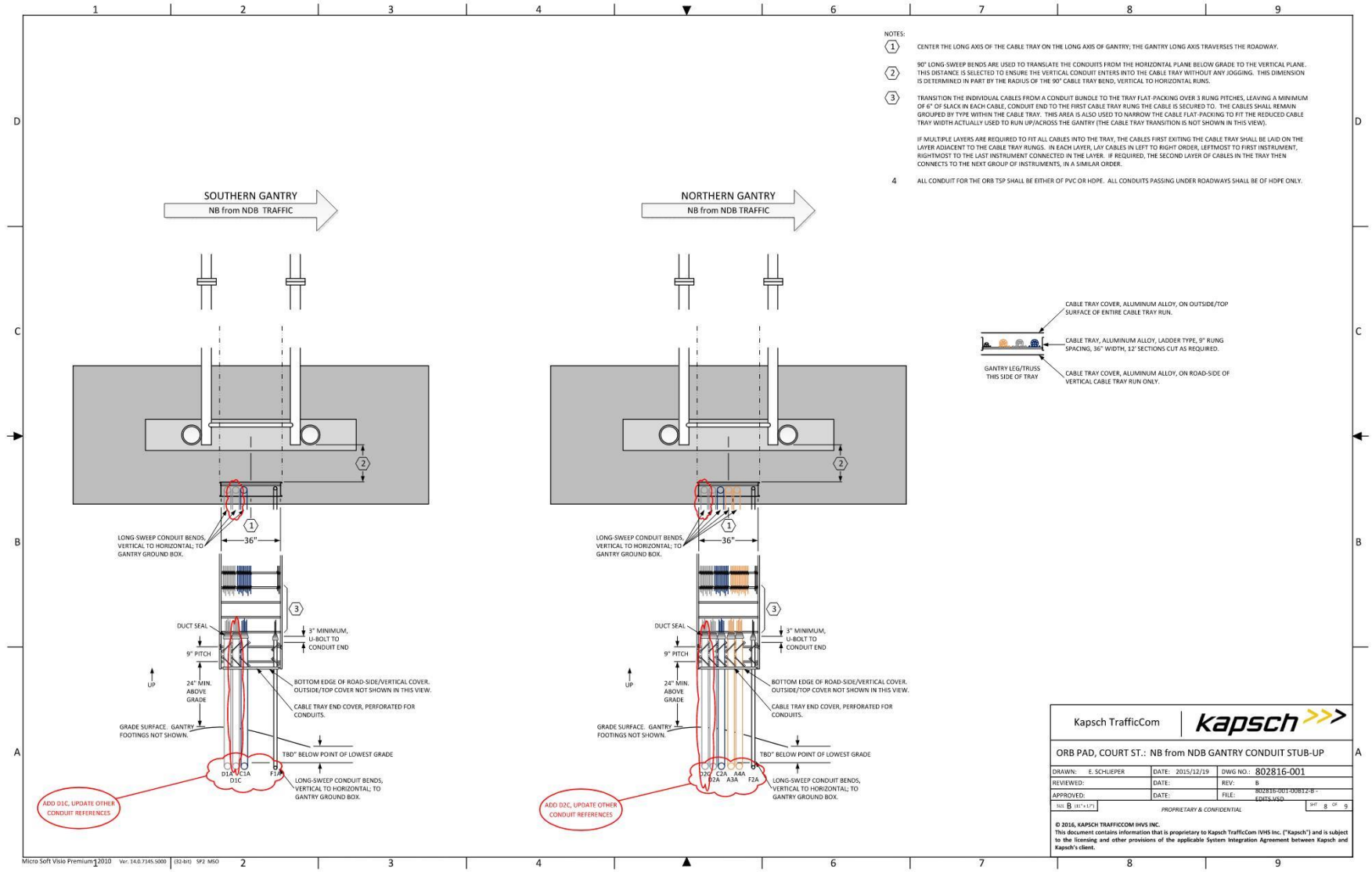
Micro Soft Visio Premium 2010


NOTES:
1 CENTER THE LONG AXIS OF THE CABLE TRAY ON THE LONG AXIS OF GANTRY; THE GANTRY LONG AXIS TRAVERSES THE ROADWAY.
2 90° LONG-SWEEP BENDS ARE USED TO TRANSLATE THE CONDUITS FROM THE HORIZONTAL PLANE BELOW GRADE TO THE VERTICAL PLANE. THIS DISTANCE IS SELECTED TO ENSURE THE VERTICAL CONDUIT ENTERS INTO THE CABLE TRAY WITHOUT ANY JOGGING. THIS DIMENSION IS DETERMINED IN PART BY THE RADIUS OF THE 90° CABLE TRAY BEND, VERTICAL TO HORIZONTAL RUNS.
3 TRANSITION THE INDIVIDUAL CABLES FROM A CONDUIT BUNDLE TO THE TRAY FLAT-PACKING OVER 3 RUNG PITCHES, LEAVING A MINIMUM OF 6" OF SLACK IN EACH CABLE, CONDUIT END TO THE FIRST CABLE TRAY RUNG THE CABLE IS SECURED TO. THE CABLES SHALL REMAIN GROUPED BY TYPE WITHIN THE CABLE TRAY. THIS AREA IS ALSO USED TO NARROW THE CABLE FLAT-PACKING TO FIT THE REDUCED CABLE TRAY WIDTH ACTUALLY USED TO RUN UP/ACROSS THE GANTRY (THE CABLE TRAY TRANSITION IS NOT SHOWN IN THIS VIEW).
IF MULTIPLE LAYERS ARE REQUIRED TO FIT ALL CABLES INTO THE TRAY, THE CABLES FIRST EXITING THE CABLE TRAY SHALL BE LAID ON THE LAYER ADJACENT TO THE CABLE TRAY RUNGS. IN EACH LAYER, LAY CABLES IN LEFT TO RIGHT ORDER, LEFTMOST TO FIRST INSTRUMENT, RIGHTMOST TO THE LAST INSTRUMENT CONNECTED IN THE LAYER. IF REQUIRED, THE SECOND LAYER OF CABLES IN THE TRAY THEN CONNECTS TO THE NEXT GROUP OF INSTRUMENTS, IN A SIMILAR ORDER.
4 ALL CONDUIT FOR THE ORB TSP SHALL BE EITHER OF PVC OR HDPE. ALL CONDUITS PASSING UNDER ROADWAYS SHALL BE OF HDPE ONLY.
SOUTHERN GANTRY
NB from NDB TRAFFIC
NORTHERN GANTRY
NB from NDB TRAFFIC
CABLE TRAY COVER, ALUMINUM ALLOY, ON OUTSIDE/TOP SURFACE OF ENTIRE CABLE TRAY RUN.
CABLE TRAY, ALUMINUM ALLOY, LADDER TYPE, 9" RUNG SPACING, 36" WIDTH, 12' SECTIONS CUT AS REQUIRED.
CABLE TRAY COVER, ALUMINUM ALLOY, ON ROAD-SIDE OF VERTICAL CABLE TRAY RUN ONLY.
GANTRY LEG/TRUSS THIS SIDE OF TRAY
LONG-SWEEP CONDUIT BENDS, VERTICAL TO HORIZONTAL; TO GANTRY GROUND BOX.
36"
DUCT SEAL
9" PITCH
3" MINIMUM, U-BOLT TO CONDUIT END
UP
24" MIN. ABOVE GRADE
BOTTOM EDGE OF ROAD-SIDE/VERTICAL COVER. OUTSIDE/TOP COVER NOT SHOWN IN THIS VIEW.
CABLE TRAY END COVER, PERFORATED FOR CONDUITS.
GRADE SURFACE. GANTRY FOOTINGS NOT SHOWN.
TBD" BELOW POINT OF LOWEST GRADE
D1A C1A F1A
D1C
LONG-SWEEP CONDUIT BENDS, VERTICAL TO HORIZONTAL; TO GANTRY GROUND BOX.
ADD D1C, UPDATE OTHER CONDUIT REFERENCES
D2C C2A A4A
D2A A3A F2A
ADD D2C, UPDATE OTHER CONDUIT REFERENCES
Kapsch TrafficCom
kapsch
ORB PAD, COURT ST.: NB from NDB GANTRY CONDUIT STUB-UP
DRAWN: E. SCHUEPER
DATE: 2015/12/19
DWG NO.: 802816-001
REVIEWED:
DATE:
REV: B
APPROVED:
DATE:
FILE: 802816-001-00B12-B - EDITS.VSD
SIZE B (11" x 17")
SHT 8 OF 9
PROPRIETARY & CONFIDENTIAL
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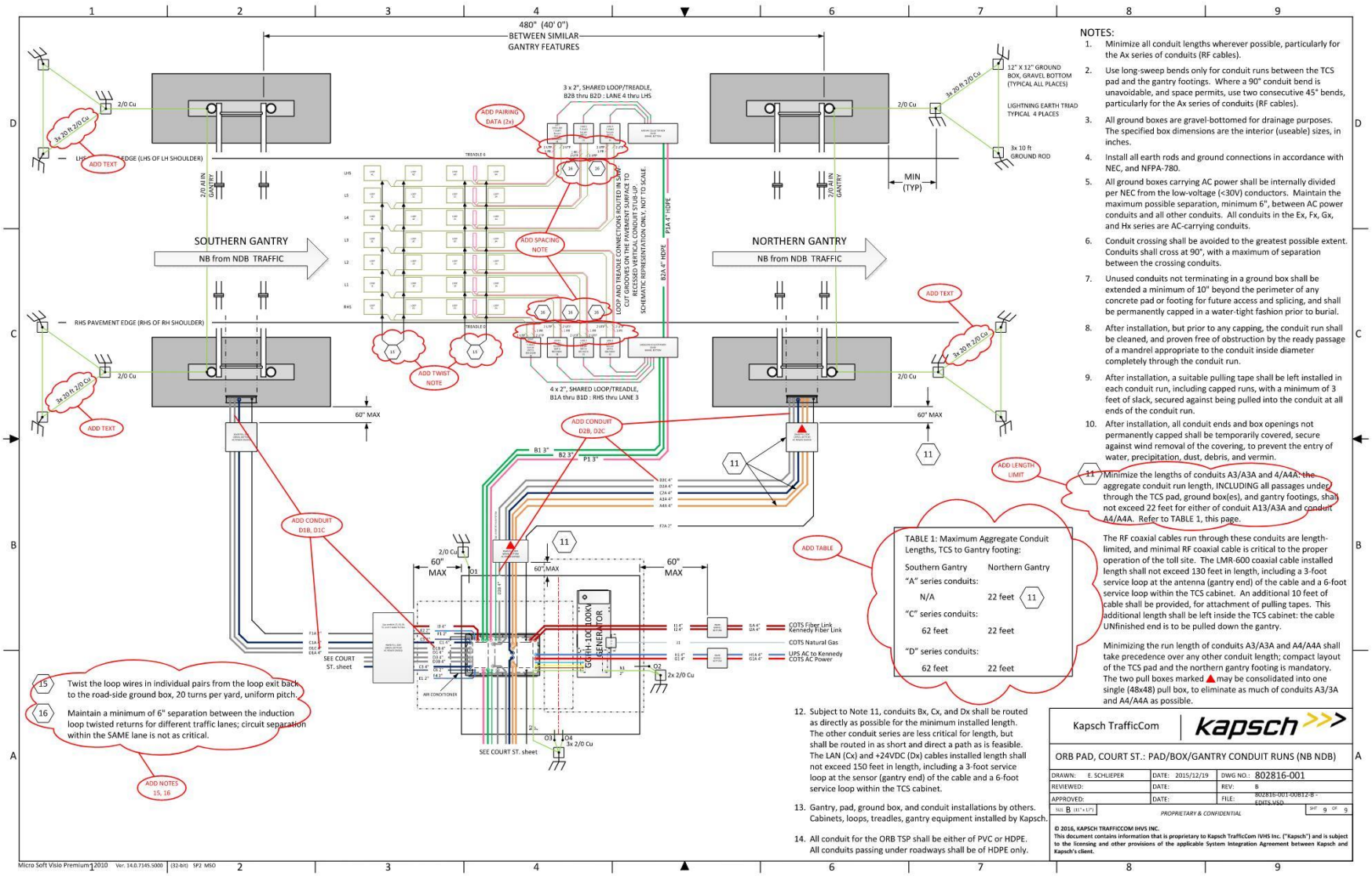
Micro Soft Visio Premium 2010 Ver. 14.0.7145.5000 (32-bit) SP2 MSO



NOTES:

1. Minimize all conduit lengths wherever possible, particularly for the Ax series of conduits (RF cables).
2. Use long-sweep bends only for conduit runs between the TCS pad and the gantry footings. Where a 90° conduit bend is unavoidable, and space permits, use two consecutive 45° bends, particularly for the Ax series of conduits (RF cables).
3. All ground boxes are gravel-bottomed for drainage purposes. The specified box dimensions are the interior (useable) sizes, in inches.
4. Install all earth rods and ground connections in accordance with NEC, and NFPA-780.
5. All ground boxes carrying AC power shall be internally divided per NEC from the low-voltage (<30V) conductors. Maintain the maximum possible separation, minimum 6", between AC power conduits and all other conduits. All conduits in the Ex, Fx, Gx, and Hx series are AC-carrying conduits.
6. Conduit crossing shall be avoided to the greatest possible extent. Conduits shall cross at 90°, with a maximum of separation between the crossing conduits.
7. Unused conduits not terminating in a ground box shall be extended a minimum of 10" beyond the perimeter of any concrete pad or footing for future access and splicing, and shall be permanently capped in a water-tight fashion prior to burial.
8. After installation, but prior to any capping, the conduit run shall be cleaned, and proven free of obstruction by the ready passage of a mandrel appropriate to the conduit inside diameter completely through the conduit run.
9. After installation, a suitable pulling tape shall be left installed in each conduit run, including capped runs, with a minimum of 3 feet of slack, secured against being pulled into the conduit at all ends of the conduit run.
10. After installation, all conduit ends and box openings not permanently capped shall be temporarily covered, secure against wind removal of the covering, to prevent the entry of water, precipitation, dust, debris, and vermin.

11 Minimize the lengths of conduits A3/A3A and 4/A4A: the aggregate conduit run length, INCLUDING all passages under through the TCS pad, ground box(es), and gantry footings, shall not exceed 22 feet for either of conduit A13/A3A and conduit A4/A4A. Refer to TABLE 1, this page.

The RF coaxial cables run through these conduits are length-limited, and minimal RF coaxial cable is critical to the proper operation of the toll site. The LMR-600 coaxial cable installed length shall not exceed 130 feet in length, including a 3-foot service loop at the antenna (gantry end) of the cable and a 6-foot service loop within the TCS cabinet. An additional 10 feet of cable shall be provided, for attachment of pulling tapes. This additional length shall be left inside the TCS cabinet: the cable UNfinished end is to be pulled down the gantry.

Minimizing the run length of conduits A3/A3A and A4/A4A shall take precedence over any other conduit length; compact layout of the TCS pad and the northern gantry footing is mandatory. The two pull boxes marked ▲ may be consolidated into one single (48x48) pull box, to eliminate as much of conduits A3/3A and A4/A4A as possible.

TABLE 1: Maximum Aggregate Conduit Lengths, TCS to Gantry footing:

Southern Gantry	Northern Gantry
"A" series conduits:	
N/A	22 feet (11)
"C" series conduits:	
62 feet	22 feet
"D" series conduits:	
62 feet	22 feet

15 Twist the loop wires in individual pairs from the loop exit back to the road-side ground box, 20 turns per yard, uniform pitch.

16 Maintain a minimum of 6" separation between the induction loop twisted returns for different traffic lanes; circuit separation within the SAME lane is not as critical.

12. Subject to Note 11, conduits Bx, Cx, and Dx shall be routed as directly as possible for the minimum installed length. The other conduit series are less critical for length, but shall be routed in as short and direct a path as is feasible. The LAN (Cx) and +24VDC (Dx) cables installed length shall not exceed 150 feet in length, including a 3-foot service loop at the sensor (gantry end) of the cable and a 6-foot service loop within the TCS cabinet.
13. Gantry, pad, ground box, and conduit installations by others. Cabinets, loops, treadles, gantry equipment installed by Kapsch.
14. All conduit for the ORB TSP shall be either of PVC or HDPE. All conduits passing under roadways shall be of HDPE only.

Kapsch TrafficCom | kapsch

ORB PAD, COURT ST.: PAD/BOX/GANTRY CONDUIT RUNS (NB NDB)

DRAWN: E. SCHLIEPER	DATE: 2015/12/19	DWG NO.: 802816-001	
REVIEWED:	DATE:	REV: B	
APPROVED:	DATE:	FILE: 802816-001-00B12-B - EDITS.VSD	
SIZE B (11" x 17")	PROPRIETARY & CONFIDENTIAL	SHT 9 OF 9	

Generator Specifications and Semi-Annual Inspections

Location	Manufacturer	P/N	Serial #	Description
Court Ave Toll Pad	Cummins	C100	F160971776	C100 GENERATOR
Court Ave Toll Pad	Cummins	OTECSEC-1626018	F16M966776	400-amp Automatic Transfer Switch
Court Ave Toll Pad	Cummins	A040X126	D16V003909	PC500-LAN Power Command Controller
East End Toll Pad	Cummins	C40	G160972079	C40 GENERATOR
East End Toll Pad	Cummins	OTECSEB-1626019	F16M966389	200-amp Automatic Transfer Switch
East End Toll Pad	Cummins	A040X126	D16V003909	PC500-LAN Power Command Controller

2019 Generator Inspections

#1096

Cummins Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	6-19-19
ADDRESS:	I-265/KY-841 SOUTH PROSPECT KY 40059	**SERVICE ORDER #:**	22039
		FA JOB ID:	J256945
SITE NAME:	KAPSCH - EAST END BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	G160972079	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 40KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C40 N6 (GG02-1626499-A)	**MODEL:**	
PRODUCT SERIAL:	G160972079	**SERIAL:**	
PROD HOURS / MILES / KM:	15.3	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN	
✔			**A. PRE-OPERATIONAL CHECKS**

B. BATTERIES AND BATTERY CHARGER (PASS ✔)

Battery install date: 11/2017 — Float Volts: 13.1 — Current: .3

Record highest and lowest specific gravity measured:

High: Sealed — Low: Sealed

Battery load test: — Test CCA: 1110 — Ambient temp: 84

Battery 1:	Float Volts:		Hold Volts:		Pass/Fail:
Battery 2:	Float Volts:		Hold Volts:		Pass/Fail:
Battery 3:	Float Volts:		Hold Volts:		Pass/Fail:
Battery 4:	Float Volts:		Hold Volts:		Pass/Fail:

C. COOLING SYSTEM (PASS ✔)

Last coolant fill date: ? — Last coolant maint date (Belts, hoses, coolant): ?

Jacket water temp: 78 °F — Cooling system pressure: na PSI

Coolant Properties:

Freeze point: -32 — DCA Concentration: na — PH level: 8.0

Sulfates: Pass — Chlorides: Pass — Appearance: Good

LTA Coolant:

Freeze point: Na — Appearance: Na — PH level: Na

PASS	N/A	NEEDS ATTN	
✔			**D. GENSET CONTROLS AND ACCESORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	Nat gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 208

✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	na	Oil Temperature:	Na	Coolant temp:	178
Battery Voltage:	14.5	Engine speed:	1800	Exhaust temp:	na
Coolant press:	Na	Blowby flow:	na	LTA temp:	Na
Genset Voltage:	208	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

✔			**M. SITE PREDEPARTURE VERIFICATION**

Comments:

	1st Trip	2nd Trip	3rd Trip	4th Trip
Start Odometer Reading				
Stop Odometer Reading				
Total Mileage				

Cummins OneBMS US 11101 Nations Ford Road Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 6-19-19
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

#1110

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	6-19-19
ADDRESS:	I 65N @ W MAPLE STREET JEFFERSONVILLE IN 47130	**SERVICE ORDER #:**	22038
		FA JOB ID:	J256944
SITE NAME:	KAPSCH - LINCOLN BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	F160971776	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 100KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C100 N6 (GG06-1626498-A)	**MODEL:**	
PRODUCT SERIAL:	F160971776	**SERIAL:**	
PROD HOURS / MILES / KM:	20.9	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN	
✔			**A. PRE-OPERATIONAL CHECKS**

B. BATTERIES AND BATTERY CHARGER

Battery install date: 10/2017 | Float Volts: 13.1 | Current: .4

Record highest and lowest specific gravity measured:

High: Sealed | Low: Sealed

Battery load test: | Test CCA: 855 | Ambient temp: 80

Battery 1:	Float Volts:		Hold Volts:		Pass/Fail:
Battery 2:	Float Volts:		Hold Volts:		Pass/Fail:
Battery 3:	Float Volts:		Hold Volts:		Pass/Fail:
Battery 4:	Float Volts:		Hold Volts:		Pass/Fail:

C. COOLING SYSTEM

Last coolant fill date: ? | Last coolant maint date (Belts, hoses, coolant): ?

Jacket water temp: 77 °F | Cooling system pressure: Na PSI

Coolant Properties:

Freeze point: -35 | DCA Concentration: na | PH level: 8.0

Sulfates: Pass | Chlorides: Pass | Appearance: Good

LTA Coolant:

Freeze point: Na | Appearance: Na | PH level: Na

PASS	N/A	NEEDS ATTN	
✔			**D. GENSET CONTROLS AND ACCESORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	Nat gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 208

PASS	N/A	NEEDS ATTN	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	66	Oil Temperature:	na	Coolant temp:	175
Battery Voltage:	14.3	Engine speed:	1800	Exhaust temp:	na
Coolant press:	na	Blowby flow:	na	LTA temp:	Na
Genset Voltage:	212	Genset freq/Hz	60.2	Load PF:	Na
Current:					
A:	na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN	
✔			**M. SITE PREDEPARTURE VERIFICATION**

Comments:

	1st Trip	2nd Trip	3rd Trip	4th Trip
Start Odometer Reading				
Stop Odometer Reading				
Total Mileage				

Cummins OneBMS US 11101 Nations Ford Road Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 6-19-19
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	12/16/19
ADDRESS:	I 65N @ W MAPLE STREET JEFFERSONVILLE IN 47130	**SERVICE ORDER #:**	23518
		FA JOB ID:	J415421
SITE NAME:	KAPSCH - LINCOLN BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	F160971776	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 100KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C100 N6 (GG06-1626498-A)	**MODEL:**	
PRODUCT SERIAL:	F160971776	**SERIAL:**	
PROD HOURS / MILES / KM:	26.1	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN.	
✓			**A. PRE-OPERATIONAL CHECKS**

B. BATTERIES AND BATTERY CHARGER

Battery install date:	9/16/19	Float Volts:	14.0	Current:	1.2
Record highest and lowest specific gravity measured:					
High:	Sealed	Low:	Sealed		
Battery load test:		Test CCA:	695	Ambient temp:	34
Battery 1: Float Volts:		Hold Volts:		Pass/Fail:	Pass
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:	

C. COOLING SYSTEM

Last coolant fill date:		Last coolant maint date (Belts, hoses, coolant):			
Jacket water temp:	92 °F	Cooling system pressure:	N PSI		
Coolant Properties:					
Freeze point:	-32	DCA Concentration:	Na	PH level:	8.0
Sulfates:	Pass	Chlorides:	Pass	Appearance:	Good
LTA Coolant:					
Freeze point:	Na	Appearance:	Na	PH level:	Na

PASS	N/A	NEEDS ATTN.	
✓			**D. GENSET CONTROLS AND ACCESSORIES**
✓			**E. MAIN ALTERNATOR**
✓			**F. FUEL SYSTEM**

Main tank fuel level:	Natural gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN.	
✓			**G. INTAKE AND EXHAUST SYSTEMS**
✓			**H. ENGINE AND LUBRICATION SYSTEM**
✓			**I. GENERATOR OPERATIONS**
✓			**J. LUBRICATION OIL AND FILTRATION SERVICE**
✓			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 210

PASS	N/A	NEEDS ATTN.	
✓			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	66	Oil Temperature:	N	Coolant temp:	168
Battery Voltage:	14.5	Engine speed:	1800	Exhaust temp:	Na
Coolant press:	Na	Blowby flow:	Na	LTA temp:	Na
Genset Voltage:	210	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	Na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN.	
✓			**M. SITE PRE-DEPARTURE VERIFICATION**

Comments:

Cummins OneBMS US Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 12/16/19
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record CCA, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

J. LUBRICATION OIL AND FILTRATION SERVICE

1. Change lube oil
2. Change lube oil filters, apply date and run hours to filter canister
3. Change fuel filters, apply date and run hours to filter canister
4. Drain sediment from coolant heater where equipped
5. Change coolant filters as equipped, apply date, freeze point and dca concentration to canister
6. Pressure test cooling system and record PSI readings
7. Check fan, water pump, drives and pulleys
8. Grease serviceable bearings
9. Post Lube service operation of Genset unloaded
10. Oil sample for laboratory analysis when recommended"
11. Change crankcase ventilation filter (if applicable)

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	12/16/19
ADDRESS:	I-265/KY-841 SOUTH PROSPECT KY 40059	**SERVICE ORDER #:**	23519
		FA JOB ID:	J415422
SITE NAME:	KAPSCH - EAST END BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	G160972079	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 40KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C40 N6 (GG02-1626499-A)	**MODEL:**	
PRODUCT SERIAL:	G160972079	**SERIAL:**	
PROD HOURS / MILES / KM:	19.3	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN.	
✓			**A. PRE-OPERATIONAL CHECKS**

B. BATTERIES AND BATTERY CHARGER

Battery install date:	12/16/19	Float Volts:	13.1	Current:	1.0
Record highest and lowest specific gravity measured:					
High:	Sealed	Low:	Sealed		
Battery load test:		Test CCA:	715	Ambient temp:	35

Battery 1: Float Volts:		Hold Volts:		Pass/Fail: Pass
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:

C. COOLING SYSTEM ✓

Last coolant fill date:				Last coolant maint date (Belts, hoses, coolant):	
Jacket water temp:	71 °F			Cooling system pressure:	Na PSI
Coolant Properties:					
Freeze point:	-32	DCA Concentration:	Na	PH level:	8.0
Sulfates:	Pass	Chlorides:	Pass	Appearance:	Good
LTA Coolant:					
Freeze point:	Na	Appearance:	Na	PH level:	Na

PASS	N/A	NEEDS ATTN.	
✓			**D. GENSET CONTROLS AND ACCESSORIES**
✓			**E. MAIN ALTERNATOR**
✓			**F. FUEL SYSTEM**

Main tank fuel level:	Natural gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN.	
✓			**G. INTAKE AND EXHAUST SYSTEMS**
✓			**H. ENGINE AND LUBRICATION SYSTEM**
✓			**I. GENERATOR OPERATIONS**
✓			**J. LUBRICATION OIL AND FILTRATION SERVICE**
✓			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage:

PASS	N/A	NEEDS ATTN.	
✓			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	Na	Oil Temperature:		Coolant temp:	147
Battery Voltage:	14.5	Engine speed:	1800	Exhaust temp:	Na
Coolant press:	Na	Blowby flow:	Na	LTA temp:	Na
Genset Voltage:	208	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	Na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN.	
✓			**M. SITE PRE-DEPARTURE VERIFICATION**

Comments:

Cummins OneBMS US Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 12/16/19
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record CCA, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

J. LUBRICATION OIL AND FILTRATION SERVICE

1. Change lube oil
2. Change lube oil filters, apply date and run hours to filter canister
3. Change fuel filters, apply date and run hours to filter canister
4. Drain sediment from coolant heater where equipped
5. Change coolant filters as equipped, apply date, freeze point and dca concentration to canister
6. Pressure test cooling system and record PSI readings
7. Check fan, water pump, drives and pulleys
8. Grease serviceable bearings
9. Post Lube service operation of Genset unloaded
10. Oil sample for laboratory analysis when recommended"
11. Change crankcase ventilation filter (if applicable)

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

2020 Generator Inspections

Cummins Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	6/4/20
ADDRESS:	I-265/KY-841 SOUTH PROSPECT KY 40059	**SERVICE ORDER #:**	24924
		FA JOB ID:	J564373
SITE NAME:	KAPSCH - EAST END BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	G160972079	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 40KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C40 N6 (GG02-1626499-A)	**MODEL:**	
PRODUCT SERIAL:	G160972079	**SERIAL:**	
PROD HOURS / MILES / KM:	21.0	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN	
✔			**A. PRE-OPERATIONAL CHECKS**

B. BATTERIES AND BATTERY CHARGER

Battery install date:	12/5/18	Float Volts:	12.8	Current:	1.2
Record highest and lowest specific gravity measured:					
High:	Sealed	Low:	Sealed		
Battery load test:		Test CCA:	800	Ambient temp:	80
Battery 1: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:	

C. COOLING SYSTEM

Last coolant fill date:		Last coolant maint date (Belts, hoses, coolant):			
Jacket water temp:	90 °F	Cooling system pressure:	Na PSI		
Coolant Properties:					
Freeze point:	-32	DCA Concentration:	Na	PH level:	8.0
Sulfates:	Pass	Chlorides:	Pass	Appearance:	Good
LTA Coolant:					
Freeze point:	Na	Appearance:	Na	PH level:	Na

PASS	N/A	NEEDS ATTN	
✔			**D. GENSET CONTROLS AND ACCESORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	Natural gas		Second Main tank fuel level:	Na	
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 209

PASS	N/A	NEEDS ATTN	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	55	Oil Temperature:	Na	Coolant temp:	175
Battery Voltage:	1.0	Engine speed:	1800	Exhaust temp:	Na
Coolant press:	Na	Blowby flow:	Na	LTA temp:	Na
Genset Voltage:	209	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	Na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN	
✔			**M. SITE PREDEPARTURE VERIFICATION**

Comments:

	1st Trip	2nd Trip	3rd Trip	4th Trip
Start Odometer Reading				
Stop Odometer Reading				
Total Mileage				

Cummins OneBMS US 11101 Nations Ford Road Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 6/4/20
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record cca, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA, and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	5/4/20
ADDRESS:	I 65N @ W MAPLE STREET JEFFERSONVILLE IN 47130	**SERVICE ORDER #:**	24923
		FA JOB ID:	J564372
SITE NAME:	KAPSCH - LINCOLN BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	F160971776	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 100KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C100 N6 (GG06-1626498-A)	**MODEL:**	
PRODUCT SERIAL:	F160971776	**SERIAL:**	
PROD HOURS / MILES / KM:	28.2	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN	
✔			**A. PRE-OPERATIONAL CHECKS**

✔			**B. BATTERIES AND BATTERY CHARGER**			
Battery install date:	12/5/19	Float Volts:	12.9	Current:	1.0	
Record highest and lowest specific gravity measured:						
High:	Sealed	Low:	Sealed			
Battery load test:		Test CCA:	755	Ambient temp:	78	
Battery 1: Float Volts:		Hold Volts:		Pass/Fail:	Pass	
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:		

✔			**C. COOLING SYSTEM**			
Last coolant fill date:				Last coolant maint date (Belts, hoses, coolant):		
Jacket water temp:		°F		Cooling system pressure:	Na	PSI
Coolant Properties:						
Freeze point:	-32	DCA Concentration:	Na	PH level:	8.0	
Sulfates:	Pass	Chlorides:	Pass	Appearance:	Good	
LTA Coolant:						
Freeze point:	Na	Appearance:	Na	PH level:	Na	

PASS	N/A	NEEDS ATTN	
✔			**D. GENSET CONTROLS AND ACCESORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	Natural gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 208

PASS	N/A	NEEDS ATTN	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	66	Oil Temperature:	Na	Coolant temp:	176
Battery Voltage:	14.3	Engine speed:	1800	Exhaust temp:	Na
Coolant press:	Na	Blowby flow:	Na	LTA temp:	Na
Genset Voltage:	208	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	Na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN	
✔			**M. SITE PREDEPARTURE VERIFICATION**

Comments:

	1st Trip	2nd Trip	3rd Trip	4th Trip
Start Odometer Reading				
Stop Odometer Reading				
Total Mileage				

Cummins OneBMS US 11101 Nations Ford Road Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 6/4/20
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record cca, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA, and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	2/8/21
ADDRESS:	I-265/KY-841 SOUTH PROSPECT KY 40059	**SERVICE ORDER #:**	26385
		FA JOB ID:	J702109
SITE NAME:	KAPSCH - EAST END BRIDGE	**TECHNICIAN:**	Christopher Owen
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	G160972079	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 40KW NG GENERATOR	**MANUFACTURER:**	CUMMINS
PRODUCT MODEL:	C40 N6 (GG02-1626499-A)	**MODEL:**	QCEXB02.4AAA
PRODUCT SERIAL:	G160972079	**SERIAL:**	G160972079
PROD HOURS / MILES / KM:	25.6	**HOURS / MILES / KM:**	25.6

PASS	N/A	NEEDS ATTN.	
✓			**A. PRE-OPERATIONAL CHECKS**

✓			**B. BATTERIES AND BATTERY CHARGER**			
Battery install date:	10-2019	Float Volts:	13.1	Current:	.1	
Record highest and lowest specific gravity measured:						
High:	14.4	Low:	11.3			
Battery load test:		Test CCA:		Ambient temp:	20	
Battery 1: Float Volts:	13.1	Hold Volts:	11.3	Pass/Fail:	Pass	
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:		

✓			**C. COOLING SYSTEM**			
Last coolant fill date:	2016			Last coolant maint date (Belts, hoses, coolant):	2016	
Jacket water temp:	89	°F		Cooling system pressure:		PSI
Coolant Properties:						
Freeze point:	-28	DCA Concentration:		PH level:		
Sulfates:		Chlorides:		Appearance:	NORMAL	
LTA Coolant:						
Freeze point:		Appearance:		PH level:		

PASS	N/A	NEEDS ATTN.	
✓			**D. GENSET CONTROLS AND ACCESSORIES**
✓			**E. MAIN ALTERNATOR**
✓			**F. FUEL SYSTEM**

Main tank fuel level:	N/G	Second Main tank fuel level:			
Day tank fuel level:					
Fuel pressure:		Running:		Loaded:	

✓			**G. INTAKE AND EXHAUST SYSTEMS**
✓			**H. ENGINE AND LUBRICATION SYSTEM**
	✓		**I. GENERATOR OPERATIONS**
✓			**J. LUBRICATION OIL AND FILTRATION SERVICE**
✓			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 214

✓			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	N/A	Oil Temperature:	N/A	Coolant temp:	170
Battery Voltage:	14.4	Engine speed:	1800	Exhaust temp:	
Coolant press:		Blowby flow:		LTA temp:	
Genset Voltage:	211	Genset freq/Hz	60	Load PF:	

Current:

A:		B:		C:	
Load kW:		Load kVA:		Load kVAR:	

Duration system test: 20 Minutes

✓			**M. SITE PRE-DEPARTURE VERIFICATION**

Comments:
ENGINE WILL NOT START COULD NOT RUN.AIR CLEANER NEEDS TO BE REPLACED FULL OF RODENT DROPPINGS.HAD TO SHOP VAC ALTERNATOR END HAD VERY LARGE RODENT NEST ON TOP OF LUGS.ALSO HAD TO REMOVE NEST FROM INSIDE CONTROL PANEL WERE RELAYS AND 3201 PCC IS.WOULD SAY THAT IS WHY.ALSO PUT RODENT MEDICINE IN GENERATOR HOUSING. SERVICED GENERATOR WHEN TIME TO START ENGINE WOULD NOT START UNIT HAD FAULT CODE 359 THEN IT WENT TO 1417 FOLLOWED TROUBLE TREE.REMOVED #4 SPARK PLUG BOOT FROM COIL TO SEE IF IT WAS GETTING FIRE WAS NOT.REMOVED TOP TO ALTERNATOR FOUND BIG RODENT NEST ON TOP OF LUGS.SHOP VAC IT GONE.THEN REMOVED SIDE PANELS TO ACCESS BASE BOARD UNPLUGGED BASE BOARD TO RESET CONTROL FAULT CAME BACK SO

Cummins OneBMS US Charlotte NC 28241	**TECHNICIAN NAME:** Christopher Owen	**TECHNICIAN SIGNATURE:** MILLER	**DATE:** 02/09/21
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record CCA, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

J. LUBRICATION OIL AND FILTRATION SERVICE

1. Change lube oil
2. Change lube oil filters, apply date and run hours to filter canister
3. Change fuel filters, apply date and run hours to filter canister
4. Drain sediment from coolant heater where equipped
5. Change coolant filters as equipped, apply date, freeze point and dca concentration to canister
6. Pressure test cooling system and record PSI readings
7. Check fan, water pump, drives and pulleys
8. Grease serviceable bearings
9. Post Lube service operation of Genset unloaded
10. Oil sample for laboratory analysis when recommended"
11. Change crankcase ventilation filter (if applicable)

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	2/8/21
ADDRESS:	I 65N @ W MAPLE STREET JEFFERSONVILLE IN 47130	**SERVICE ORDER #:**	26384
		FA JOB ID:	J702108
SITE NAME:	KAPSCH - LINCOLN BRIDGE	**TECHNICIAN:**	Thomas Miller
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	F160971776	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 100KW NG GENERATOR	**MANUFACTURER:**	CUMMINS
PRODUCT MODEL:	C100 N6 (GG06-1626498-A)	**MODEL:**	GCEXB05.9ALB
PRODUCT SERIAL:	F160971776	**SERIAL:**	F160971776
PROD HOURS / MILES / KM:		**HOURS / MILES / KM:**	32.0 / 32.5

PASS	N/A	NEEDS ATTN.	
✓			**A. PRE-OPERATIONAL CHECKS**

✓			**B. BATTERIES AND BATTERY CHARGER**					
			Battery install date:	09-10-2019	Float Volts:	12.9	Current:	.2
			Record highest and lowest specific gravity measured:					
			High:	14.4	Low:	10.7		
			Battery load test:		Test CCA:	630	Ambient temp:	24
			Battery 1: Float Volts:	12.9	Hold Volts:	10.7	Pass/Fail:	Pass
			Battery 2: Float Volts:		Hold Volts:		Pass/Fail:	
			Battery 3: Float Volts:		Hold Volts:		Pass/Fail:	
			Battery 4: Float Volts:		Hold Volts:		Pass/Fail:	

✓			**C. COOLING SYSTEM**					
			Last coolant fill date:	2016			Last coolant maint date (Belts, hoses, coolant):	2016
			Jacket water temp:	70	°F		Cooling system pressure:	PSI
			Coolant Properties:					
			Freeze point:	-30	DCA Concentration:	2.5	PH level:	
			Sulfates:		Chlorides:		Appearance:	NORMAL
			LTA Coolant:					
			Freeze point:		Appearance:		PH level:	

PASS	N/A	NEEDS ATTN.	
✓			**D. GENSET CONTROLS AND ACCESSORIES**
✓			**E. MAIN ALTERNATOR**
✓			**F. FUEL SYSTEM**

Main tank fuel level:	N/G	Second Main tank fuel level:			
Day tank fuel level:					
Fuel pressure:		Running:		Loaded:	

✓			**G. INTAKE AND EXHAUST SYSTEMS**
✓			**H. ENGINE AND LUBRICATION SYSTEM**
✓			**I. GENERATOR OPERATIONS**
✓			**J. LUBRICATION OIL AND FILTRATION SERVICE**
✓			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 212/123

✓			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	74	Oil Temperature:		Coolant temp:	160
Battery Voltage:	14.4	Engine speed:	1800	Exhaust temp:	
Coolant press:		Blowby flow:		LTA temp:	
Genset Voltage:	211	Genset freq/Hz	60	Load PF:	
Current:					
A:		B:		C:	
Load kW:		Load kVA:		Load kVAR:	

Duration system test: 30 Minutes

✓			**M. SITE PRE-DEPARTURE VERIFICATION**

Comments:
PERFORMED FULL SERVICE ON GENSET WHILE ENGINE IS CRANKING IT WILL TRIGGER 1246 FAULT BUT CLEAR SOON AS YOU TURN OFF GENSET UNKNOWN ENGINE FAULT.PLACED UNIT BACK IN AUTO AFTER RUNNING.

Cummins OneBMS US Charlotte NC 28241	**TECHNICIAN NAME:** Thomas Miller	**TECHNICIAN SIGNATURE:** MILLER	**DATE:** 2/8/21
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record CCA, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

J. LUBRICATION OIL AND FILTRATION SERVICE

1. Change lube oil
2. Change lube oil filters, apply date and run hours to filter canister
3. Change fuel filters, apply date and run hours to filter canister
4. Drain sediment from coolant heater where equipped
5. Change coolant filters as equipped, apply date, freeze point and dca concentration to canister
6. Pressure test cooling system and record PSI readings
7. Check fan, water pump, drives and pulleys
8. Grease serviceable bearings
9. Post Lube service operation of Genset unloaded
10. Oil sample for laboratory analysis when recommended"
11. Change crankcase ventilation filter (if applicable)

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

2021 Generator Inspections

Cummins Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	06/15/21
ADDRESS:	I-265/KY-841 SOUTH PROSPECT KY 40059	**SERVICE ORDER #:**	27873
		FA JOB ID:	J825727
SITE NAME:	KAPSCH - EAST END BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	G160972079	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 40KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C40 N6 (GG02-1626499-A)	**MODEL:**	
PRODUCT SERIAL:	G160972079	**SERIAL:**	
PROD HOURS / MILES / KM:	27.2	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN	
✔			**A. PRE-OPERATIONAL CHECKS**

B. BATTERIES AND BATTERY CHARGER

Battery install date:	12/15/19	Float Volts:	12.9	Current:	.7
Record highest and lowest specific gravity measured:					
High:	Sealed	Low:	Sealed		
Battery load test:		Test CCA:	850	Ambient temp:	75
Battery 1: Float Volts:		Hold Volts:		Pass/Fail:	Pass
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:	
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:	

✔ **C. COOLING SYSTEM**

Last coolant fill date:		Last coolant maint date (Belts, hoses, coolant):			
Jacket water temp:	73 °F	Cooling system pressure:	Na PSI		
Coolant Properties:					
Freeze point:	-32	DCA Concentration:	Na	PH level:	8.0
Sulfates:	Pass	Chlorides:	Pass	Appearance:	Good
LTA Coolant:					
Freeze point:	Na	Appearance:	Na	PH level:	Na

PASS	N/A	NEEDS ATTN	
✔			**D. GENSET CONTROLS AND ACCESORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	Natural gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 208

PASS	N/A	NEEDS ATTN	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	Na	Oil Temperature:	Na	Coolant temp:	177
Battery Voltage:	14.3	Engine speed:	1800	Exhaust temp:	Na
Coolant press:	Na	Blowby flow:	Na	LTA temp:	Na
Genset Voltage:	210	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	Na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN	
✔			**M. SITE PREDEPARTURE VERIFICATION**

Comments:
Pm inspection

	1st Trip	2nd Trip	3rd Trip	4th Trip
Start Odometer Reading	71960			
Stop Odometer Reading	71975			
Total Mileage				

Cummins OneBMS US 11101 Nations Ford Road Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 06/15/21
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record cca, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA, and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	06/15/21
ADDRESS:	I 65N @ W MAPLE STREET JEFFERSONVILLE IN 47130	**SERVICE ORDER #:**	27872
		FA JOB ID:	J825726
SITE NAME:	KAPSCH - LINCOLN BRIDGE	**TECHNICIAN:**	Stoy Neafus
CONTACT NAME:	TREY DAVIS	**CONTACT EMAIL:**	trey.davis@kapsch.net
ASSET NAME:	F160971776	**CONTACT TEL:**	812-258-5902
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 100KW NG GENERATOR	**MANUFACTURER:**	
PRODUCT MODEL:	C100 N6 (GG06-1626498-A)	**MODEL:**	
PRODUCT SERIAL:	F160971776	**SERIAL:**	
PROD HOURS / MILES / KM:	34.9	**HOURS / MILES / KM:**	

PASS	N/A	NEEDS ATTN	
✔			**A. PRE-OPERATIONAL CHECKS**

✔			**B. BATTERIES AND BATTERY CHARGER**					
			Battery install date:	09/15/19	Float Volts:	13.8	Current:	.5
			Record highest and lowest specific gravity measured:					
			High:	Sealed	Low:	Sealed		
			Battery load test:		Test CCA:	855	Ambient temp:	70
			Battery 1: Float Volts:		Hold Volts:		Pass/Fail:	Pass
			Battery 2: Float Volts:		Hold Volts:		Pass/Fail:	
			Battery 3: Float Volts:		Hold Volts:		Pass/Fail:	
			Battery 4: Float Volts:		Hold Volts:		Pass/Fail:	

✔			**C. COOLING SYSTEM**					
			Last coolant fill date:		Last coolant maint date (Belts, hoses, coolant):			
			Jacket water temp:	75 °F	Cooling system pressure:	Na PSI		
			Coolant Properties:					
			Freeze point:	-35	DCA Concentration:	Na	PH level:	8.0
			Sulfates:	Pass	Chlorides:	Pass	Appearance:	Good
			LTA Coolant:					
			Freeze point:	Na	Appearance:	Na	PH level:	Na

PASS	N/A	NEEDS ATTN	
✔			**D. GENSET CONTROLS AND ACCESORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	Natural gas	Second Main tank fuel level:	Na		
Day tank fuel level:	Na				
Fuel pressure:	Na	Running:	Na	Loaded:	Na

PASS	N/A	NEEDS ATTN	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 208

PASS	N/A	NEEDS ATTN	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by:

Record engine and load data:

Oil pressure:	66	Oil Temperature:	Na	Coolant temp:	181
Battery Voltage:	14.3	Engine speed:	1800	Exhaust temp:	Na
Coolant press:	Na	Blowby flow:	Na	LTA temp:	Na
Genset Voltage:	210	Genset freq/Hz	60	Load PF:	Na
Current:					
A:	Na	B:	Na	C:	Na
Load kW:	Na	Load kVA:	Na	Load kVAR:	Na

Duration system test: Minutes

PASS	N/A	NEEDS ATTN	
✔			**M. SITE PREDEPARTURE VERIFICATION**

Comments:

Unit has a1246 unknown engine fault upon start,warning, tried to hook up with the laptop,but would not connect, need to update software.

	1st Trip	2nd Trip	3rd Trip	4th Trip
Start Odometer Reading	71935			
Stop Odometer Reading	71960			
Total Mileage				

Cummins OneBMS US 11101 Nations Ford Road Charlotte NC 28241	**TECHNICIAN NAME:** Stoy Neafus	**TECHNICIAN SIGNATURE:**	**DATE:** 06/15/21
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

Sales and Service

PLANNED MAINTENANCE CHECKLIST
STANDARD INSPECTION

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record cca, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA, and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	12/20/21
ADDRESS:	I 65N @ W MAPLE STREET JEFFERSONVILLE IN 47130	**SERVICE ORDER #:**	29077
		FA JOB ID:	J966185
SITE NAME:	KAPSCH - LINCOLN BRIDGE	**TECHNICIAN:**	TOMMY MILLER
CONTACT NAME:	Justin Hixon	**CONTACT EMAIL:**	justin.hixon@kapsch.net
ASSET NAME:	F160971776	**CONTACT TEL:**	812-697-7898
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 100KW NG GENERATOR	**MANUFACTURER:**	CUMMINS
PRODUCT MODEL:	C100 N6 (GG06-1626498-A)	**MODEL:**	GCEXB05.9ALB
PRODUCT SERIAL:	F160971776	**SERIAL:**	F160971776
PROD HOURS / MILES / KM:	39.5 / 40.2	**HOURS / MILES / KM:**	39.5 / 40.2

PASS	N/A	NEEDS ATTN.	
✔			**A. PRE-OPERATIONAL CHECKS**

✔			**B. BATTERIES AND BATTERY CHARGER**			
Battery install date:	10/09/19	Float Volts:	13.2	Current:	.1	
Record highest and lowest specific gravity measured:						
High:	14.3	Low:	10.7			
Battery load test:		Test CCA:	700	Ambient temp:	31	
Battery 1: Float Volts:	13.2	Hold Volts:	10.7	Pass/Fail:	Pass	
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:		

✔			**C. COOLING SYSTEM**		
Last coolant fill date:		Last coolant maint date (Belts, hoses, coolant):			
Jacket water temp:	100 °F	Cooling system pressure:		PSI	
Coolant Properties:					
Freeze point:	-40	DCA Concentration:	2.8	PH level:	
Sulfates:		Chlorides:		Appearance:	NORMAL
LTA Coolant:					
Freeze point:		Appearance:		PH level:	

PASS	N/A	NEEDS ATTN.	
✔			**D. GENSET CONTROLS AND ACCESSORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	NG	Second Main tank fuel level:			
Day tank fuel level:					
Fuel pressure:		Running:		Loaded:	

PASS	N/A	NEEDS ATTN.	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**J. LUBRICATION OIL AND FILTRATION SERVICE**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 212

PASS	N/A	NEEDS ATTN.	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by: JUSTIN HIXON

Record engine and load data:

Oil pressure:		Oil Temperature:		Coolant temp:	174
Battery Voltage:	14.3	Engine speed:	1800	Exhaust temp:	
Coolant press:		Blowby flow:		LTA temp:	
Genset Voltage:	211	Genset freq/Hz	60	Load PF:	
Current:					
A:		B:		C:	
Load kW:		Load kVA:		Load kVAR:	

Duration system test: 30 Minutes

PASS	N/A	NEEDS ATTN.	
✔			**M. SITE PRE-DEPARTURE VERIFICATION**

Comments:
PERFORMED FULL SERVICE ON GENERATOR FOUND NO ISSUES AT THIS TIME OF SERVICE. ALSO PERFORMED INSPECTION ON ATS NO ISSUES. PLACED UNIT BACK IN AUTO AFTER RUNNING.

	TECHNICIAN NAME:	TECHNICIAN SIGNATURE:	DATE:
Cummins OneBMS US	TOMMY MILLER	TOMMY MILLER	12/20/21
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

INTERNAL USE ONLY

EPA ID, if different from Cummins:

Transporter/Destination Branch: Louisville, KY -- CSSNA 9820 Bluegrass Parkway, Louisville, KY 40299 -- EPA ID# KYD980803928

Quantity of Used Oil Being Shipped in Gallons: 4	*Transporter Signature:*	Florida- Type Code: ☐ (A)-Automotive ☐ (I)-Inustrial
Quantity of Used Oil Filters: 1	*Generator Signature:*	

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record CCA, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

J. LUBRICATION OIL AND FILTRATION SERVICE

1. Change lube oil
2. Change lube oil filters, apply date and run hours to filter canister
3. Change fuel filters, apply date and run hours to filter canister
4. Drain sediment from coolant heater where equipped
5. Change coolant filters as equipped, apply date, freeze point and dca concentration to canister
6. Pressure test cooling system and record PSI readings
7. Check fan, water pump, drives and pulleys
8. Grease serviceable bearings
9. Post Lube service operation of Genset unloaded
10. Oil sample for laboratory analysis when recommended"
11. Change crankcase ventilation filter (if applicable)

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

CUSTOMER DETAILS			
CUSTOMER:	KAPSCH TRAFFICCOMM IVHS - 505667	**DATE:**	12/20/21
ADDRESS:	I-265/KY-841 SOUTH PROSPECT KY 40059	**SERVICE ORDER #:**	29078
		FA JOB ID:	J966186
SITE NAME:	KAPSCH - EAST END BRIDGE	**TECHNICIAN:**	THOMAS MILLER
CONTACT NAME:	Justin Hixon	**CONTACT EMAIL:**	justin.hixon@kapsch.net
ASSET NAME:	G160972079	**CONTACT TEL:**	812-697-7898
PRODUCT DETAILS		**SECONDARY PRODUCT DETAILS:**	
PRODUCT MANUFACTURER:	CUMMINS 40KW NG GENERATOR	**MANUFACTURER:**	CUMMINS
PRODUCT MODEL:	C40 N6 (GG02-1626499-A)	**MODEL:**	GCEXB02.4AAA
PRODUCT SERIAL:	G160972079	**SERIAL:**	G160972079
PROD HOURS / MILES / KM:	31.2 / 31.6	**HOURS / MILES / KM:**	31.2 / 31.6

PASS	N/A	NEEDS ATTN.	
✔			**A. PRE-OPERATIONAL CHECKS**

✔			**B. BATTERIES AND BATTERY CHARGER**			
Battery install date:	12/16/19	Float Volts:	13.0	Current:	.1	
Record highest and lowest specific gravity measured:						
High:	14.3	Low:	10.0			
Battery load test:		Test CCA:	700	Ambient temp:	41	
Battery 1: Float Volts:	14.3	Hold Volts:	10.0	Pass/Fail:	Pass	
Battery 2: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 3: Float Volts:		Hold Volts:		Pass/Fail:		
Battery 4: Float Volts:		Hold Volts:		Pass/Fail:		

✔			**C. COOLING SYSTEM**			
Last coolant fill date:	N/A			Last coolant maint date (Belts, hoses, coolant):	N/A	
Jacket water temp:	69	°F		Cooling system pressure:		PSI
Coolant Properties:						
Freeze point:	-40	DCA Concentration:	2.5	PH level:		
Sulfates:		Chlorides:		Appearance:	NORMAL	
LTA Coolant:						
Freeze point:		Appearance:		PH level:		

PASS	N/A	NEEDS ATTN.	
✔			**D. GENSET CONTROLS AND ACCESSORIES**
✔			**E. MAIN ALTERNATOR**
✔			**F. FUEL SYSTEM**

Main tank fuel level:	N/G	Second Main tank fuel level:			
Day tank fuel level:					
Fuel pressure:		Running:		Loaded:	

PASS	N/A	NEEDS ATTN.	
✔			**G. INTAKE AND EXHAUST SYSTEMS**
✔			**H. ENGINE AND LUBRICATION SYSTEM**
✔			**I. GENERATOR OPERATIONS**
✔			**J. LUBRICATION OIL AND FILTRATION SERVICE**
✔			**K. TRANSFER SWITCH / SWITCHGEAR**

Measure and record utility / source one voltage: 214

PASS	N/A	NEEDS ATTN.	
✔			**L. SYSTEM OPERATIONAL TEST**

Genset test without load, load test not permitted by: JUSTIN HIXON

Record engine and load data:

Oil pressure:	N/A	Oil Temperature:		Coolant temp:	174
Battery Voltage:	14.3	Engine speed:	1800	Exhaust temp:	
Coolant press:		Blowby flow:		LTA temp:	
Genset Voltage:	208	Genset freq/Hz	60	Load PF:	
Current:					
A:	22.8	B:	18.4	C:	19.2
Load kW:		Load kVA:		Load kVAR:	

Duration system test: 20 Minutes

PASS	N/A	NEEDS ATTN.	
✔			**M. SITE PRE-DEPARTURE VERIFICATION**

Comments:
PERFORMED FULI SERVICE ON GENERATOR. BLOCK HEATER ONLY 69 DEGREES. MAY NEED TO REPLACE. NO OTHER ISSUES AT THIS TIME OF SERVICE. ALSO PERFORMED INSPECTION ON ATS NO ISSUES. PLACED UNIT BACK IN AUTO AFTER RUNNING.

Cummins OneBMS US	**TECHNICIAN NAME:**	**TECHNICIAN SIGNATURE:**	**DATE:**
	THOMAS MILLER	THOMAS MILLER	12/20/21
	CUSTOMER NAME:	**CUSTOMER SIGNATURE:**	**DATE:**

INTERNAL USE ONLY

EPA ID, if different from Cummins:

Transporter/Destination Branch: Louisville, KY -- CSSNA 9820 Bluegrass Parkway, Louisville, KY 40299 -- EPA ID# KYD980803928

Quantity of Used Oil Being Shipped in Gallons: 1.25	*Transporter Signature:*	Florida- Type Code: ☐ (A)-Automotive ☐ (I)-Inustrial
Quantity of Used Oil Filters: 1	*Generator Signature:*	

Sales and Service

PLANNED MAINTENANCE CHECKLIST
FULL SERVICE

Below is the scope of work performed during the above planned maintenance checklist. Any additional repairs, parts, or service which are required will be brought to the attention of the owner. Repairs will only be made after proper authorization from the owner is given to Cummins Sales and Service. Any additional repairs, maintenance or service performed by Cummins Sales and Service for a Planned Maintenance Agreement holder will be at Cummins Sales and Service labor rates.

A. PRE-OPERATIONAL CHECKS

1. All equipment automated, no alarms or faults on controls
2. Check fluid levels and observe for leaks. Oil, Fuel and Coolant
3. Verify battery chargers, component heaters and accessories are operational
4. Safety Audit, Lock Out/ Tag Out Procedures Followed, Safe Service Operations

B. BATTERIES AND BATTERY CHARGER

1. Check battery charger functions and record voltage and current
2. Cable connections, termination cleanliness and security
3. Check electrolyte level, vent caps and specific gravity of all cells in the starting battery system

3.a Record highest and lowest specific gravity measured.

4. Perform Battery load test on all starting batteries and record CCA, ambient temperature, float volts, hold volts, and if the battery passed or failed testing.

C. ENGINE COOLING SYSTEM

1. Inspect all hoses and clamps for leaks and condition
2. Inspect radiator cap and filler neck condition
3. Inspect drive belts, observe alignment and deflection
4. Confirm proper coolant heater operation and record jacket water temperature
5. Verify Coolant properties and record the freeze point, DCA concentration, PH level, Sulfates, Chlorides, and appearance.
6. Inspect radiator surfaces, shrouds and barriers for obstruction, build up and mechanical damages
7. Verify LTA coolant properties and record the freeze point, PH level, and appearance (if applicable)
8. Optional coolant sampling

D. GENSET CONTROLS AND ACCESSORIES

1. Check all engine mounted wiring, senders and devices
2. Check all control mounted components and wiring
3. Check all connecting plugs
4. Check all accessory components and wiring
5. Function test lights and indicators

E. MAIN ALTERNATOR

1. Remove covers and inspect terminals, wiring and component
2. Visually inspect main rotor and stator
3. Visually inspect exciter components and PMG (where equipped)
4. Manually operate generator main breaker(s) open and closed

F. FUEL SYSTEM

1. Check main and secondary (if applicable) tank fuel and record levels
2. Check day tank fuel and record level (if applicable)
3. Check day tank controls and pumps. Test operate day tank controls where available (if applicable)
4. Check all fuel hose, clamps, pipes, components and fittings
5. Check fuel pressure and record readings running and loaded
6. Check governor linkage (if applicable)
7. Water in Fuel Test - Sub-base, day tanks or as noted on agreement
8. Rupture/ Containment Basin Inspection (if applicable)

G. INTAKE AND EXHAUST SYSTEMS

1. Check air cleaner element
2. Check intake system
3. Check exhaust system and rain cap
4. Check louver operations (if applicable)

H. ENGINE AND LUBRICATION SYSTEM

1. Check lubrication system
2. Check crankcase ventilation system
3. Check spark ignited ignition system (if applicable)

I. GENERATOR OPERATIONS

1. Start and observe generator and equipment operations
2. Verify engine and generator safeties as applicable

J. LUBRICATION OIL AND FILTRATION SERVICE

1. Change lube oil
2. Change lube oil filters, apply date and run hours to filter canister
3. Change fuel filters, apply date and run hours to filter canister
4. Drain sediment from coolant heater where equipped
5. Change coolant filters as equipped, apply date, freeze point and dca concentration to canister
6. Pressure test cooling system and record PSI readings
7. Check fan, water pump, drives and pulleys
8. Grease serviceable bearings
9. Post Lube service operation of Genset unloaded
10. Oil sample for laboratory analysis when recommended"
11. Change crankcase ventilation filter (if applicable)

K. TRANSFER SWITCH/ SWITCHGEAR

1. Inspect all power and control wiring
2. Inspect switch mechanism and enclosure
3. Inspect controls and time delay settings
4. Check exercise clock
5. Verify remote start control operation
6. Measure and record utility/ source one voltage

L. SYSTEM OPERATIONAL TESTS

1. Genset test with or without load, if not allowed document decision maker
2. During test without load record engine oil pressure, oil temperature, coolant temperature, battery voltage, engine speed, exhaust temperature, coolant pressure, blowby flow, LTA temperature. Also record generator voltage on all phases, frequency, current on all phases, load PF, load KW Load KVA and Load KVAR.
3. Record duration of system test in minutes

M. SITE PRE-DEPARTURE VERIFICATION

1. All applied energy source lock out devices removed
2. All controls and components in AUTO/REMOTE
3. All GENSET breakers ON/CLOSED (except power operated paralleling breakers)
4. Battery Charger operational/ breaker ON
5. Component heaters enabled/ breaker ON
6. Site Cleanup

Changeable Message Toll Rate Signs (CMTRS)

Eight locations with a single Pelco IXE21 CCTV fixed camera focused on the signs to monitor and ensure they are operational, accurate and to verify annual toll rate changes posted on the signs.

ID	SUPPORT TYPE	LOCATION	CLOSEST PHYSICAL APPROX ADDRESS	MAP VIEW
1	Truss	I-71 SB Mainline	EDITH ROAD LOUSVILLE	https://tinyurl.com/2p8uf24
2	Ground	I-64 WB Mainline	STORY AVENUE LOUISVILLE	https://tinyurl.com/48dh74v5
3	Truss	I-64 EB Mainline	PORTLAND AVE LOUISVILLE	https://tinyurl.com/9wjhtmh5
4	Ground	I-65 NB Mainline	BROOK STREET LOUISVILLE	https://tinyurl.com/2p8ff3ht
5	Cantilever	I-65 SB Mainline	DIR 7TH MISSOURI AVE JEFFERSONVILLE	https://tinyurl.com/mryp2vch
6	Cantilever	I-65 SB Mainline	DIR I65S MM 2.4 CLARKSVILLE	https://tinyurl.com/2z9xjvbm
7	Truss	I-265 NB Mainline	SPRINGDALE ROAD PROSPECT- EXIT 37 SIGN	https://tinyurl.com/nha98jw9
8	Truss	I-265 SB Mainline	UTICA SELLERSBERG ROAD JEFFERSONVILLE	https://tinyurl.com/2pvhyrm9

Cabinet Specifications

The cabinets are fenced and well-lit with a key to the fence and a key to the cabinet.

Cabinet monitoring cameras

Manufacturer	P/N	Serial #	Version	REV	Description	QTY	Field Location
Pelco	IXE21	AED-PQZ4	2.1.2.0	AD	FIXBOX POE CAM 2MP SVIS	1	I-65 SB equipment pad
Pelco	IXE21	AEF-K255	2.1.2.0	AD	FIXBOX POE CAM 2MP SVIS	1	Court Ramp equipment pad
Pelco	IXE21	AEF-K256	2.1.2.0	AD	FIXBOX POE CAM 2MP SVIS	1	East End SB equipment pad

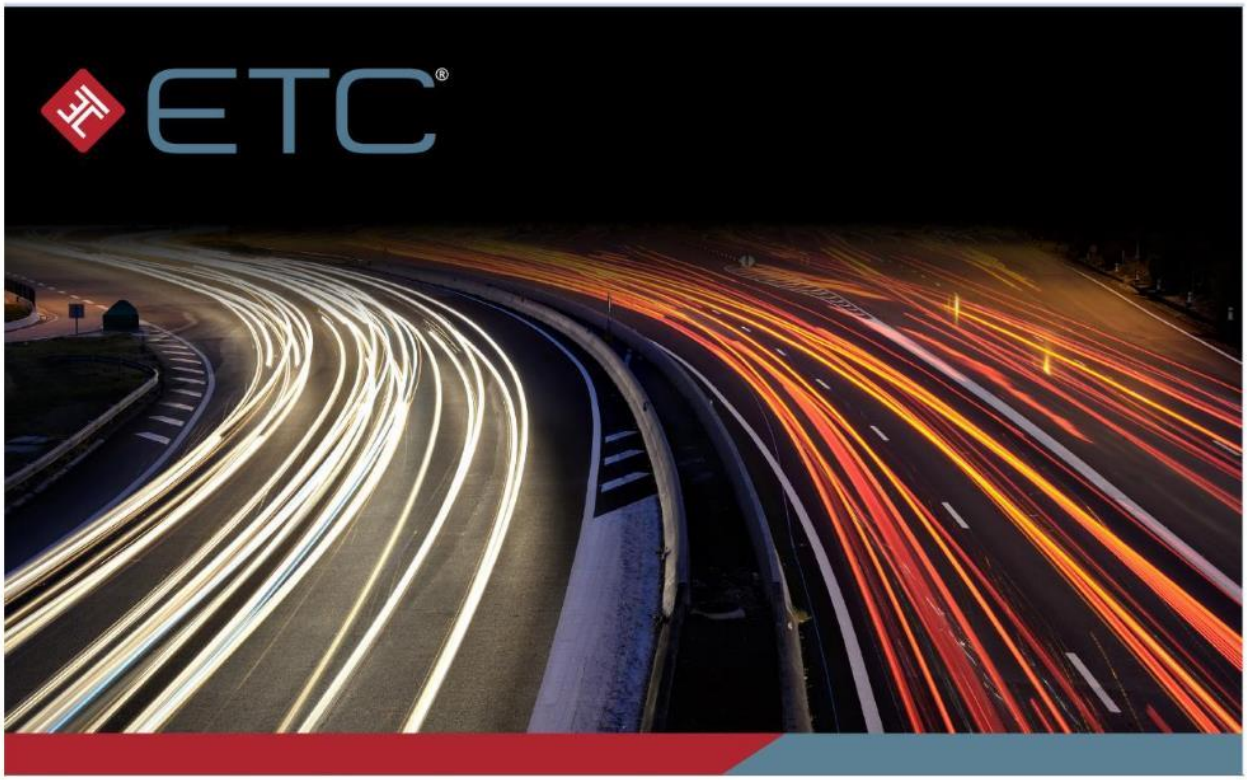
Cabinet Air Conditioners

Manufacturer	P/N	Serial #	Software Version	Description	Field Location
ICEqube	IQ8000V16H	1A798816-3	V3.86	A/C 8000 BTUH V16 STAINLESS STEEL CABINET	Kennedy TCS Door
ICEqube	IQ8000V16H	1A798916-3	V3.86	A/C 8000 BTUH V16 STAINLESS STEEL CABINET	Lincoln TCS Door
ICEqube	IQ27000VH	2A000016-3	V3.86	A/C 27000 BTUH V16 STAINLESS STEEL CABINET	Kennedy TCS Main
ICEqube	IQ27000VH	2A000116-3	V3.86	A/C 27000 BTUH V16 STAINLESS STEEL CABINET	Lincoln TCS Main
ICEqube	IQ8000V16H	1A800516-4	V3.86	A/C 8000 BTUH V16 STAINLESS STEEL CABINET	East End TCS Door

CCTV Traffic Cameras

Manufacturer	P/N	Serial #	Version	Description	QTY	Mounting Location
Pelco	ES5230-15WP	AEF-D948	1.9.2.19	Esprit 1080P PTZ Camera WPR PRES 115/230 Wall Mount	1	I-65 SB Kennedy Bridge gantry
Pelco	ES5230-15WP	AEF-D947	1.9.2.19	Esprit 1080P PTZ Camera WPR PRES 115/230 Wall Mount	1	I-65 NB Lincoln Bridge gantry
Pelco	ES5230-15WP	AEF-D946	1.9.2.19	Esprit 1080P PTZ Camera WPR PRES 115/230 Wall Mount	1	I-265 SB Lewis and Clark Bridge gantry

Section 5: RTCS to TSP2 Back Office ICD



Interface Control Document

RTCS to BOS Interface

Version 2.0

December 03, 2021

Document History

Date	Revision	Author	Summary of Changes
9/14/2021	1.0	ETC	Initial submittal
12/03/2021	2.0	ETC	Up-issued based on V2.0 comments.

Document Control

Table of Contents

Table of Figures

Table of Tables

1. General

1.1. Overview

The purpose of this Interface Control Document (ICD) is to define the message structure, communication method, and clarify information required for the exchange of data between the Roadside Toll Collection Systems (RTCS), and the Back Office System (BOS). It includes technical details and operational information necessary to ensure proper usage and support for service operation.

The data exchanges are achieved through two methods: Web Services and file-based transfers.

Changes to the specification and or agreements contained in this document must be approved and subsequently communicated via update to this document. Updated versions of this document must be distributed to all consumers and support staff for the services described herein.

1.2. Assumptions

The table below lists all assumptions used in this document.

Table 1: Assumptions

ID	Description
1.2.1	No other communication methods shall be implemented beyond what is defined in the document, Web Services, and file-based transfer.
1.2.2	If the Ack Code returned is a failure condition the RTCS vendor shall resolve the issue and resend the request within **24 hours**
1.2.3	File paths in the ICD for file transfers are communicated to the RTCS for each environment before testing. The parent folder of the file path changes based on the environment.
1.2.4	The Oracle WALLET is created within the BOS before testing the BOSFileReadyInterface service.
1.2.5	The BOS is notified of the RTCS HOST proxy server; This is a configuration in BOS to store the RTCS WSDL location. Ex. http://bos-ex-rtcs.orb.pri VPN Tunneling shall be used for the network between the BOS and the RTCS.
1.2.6	The BOS will use the Tag Status File (ITAG) format from the E-ZPass IAG file specification version 1.51m for Tag Validation List (TVL). Refer the following link for IAG file specification version 1.51m: https://www.e-zpassiag.com/images/Interoperability/File_Specifications/IAG_Inter-CSC_Files_-_Ver_CSC_01.51m_-_2021-04-23.pdf

1.3. Issues/Concerns

Table 3: Issues/Concerns

ID	Description	Resolution	Resolution Date

ID	Description	Resolution	Resolution Date

2. Process/Data Flows

2.1. Overview Process Flow

The figure below presents an overview of the RTCS to BOS interface. The figure illustrates both the Web Service request interface and the file transfer interface. Both interfaces, Web Service and file transfer, exchange different types of data, and work independently. The file transfer interface uses a BOS maintained SFTP File Server for bidirectional file delivery between the RTCS and the BOS as an indirect connection between the RTCS and the BOS.

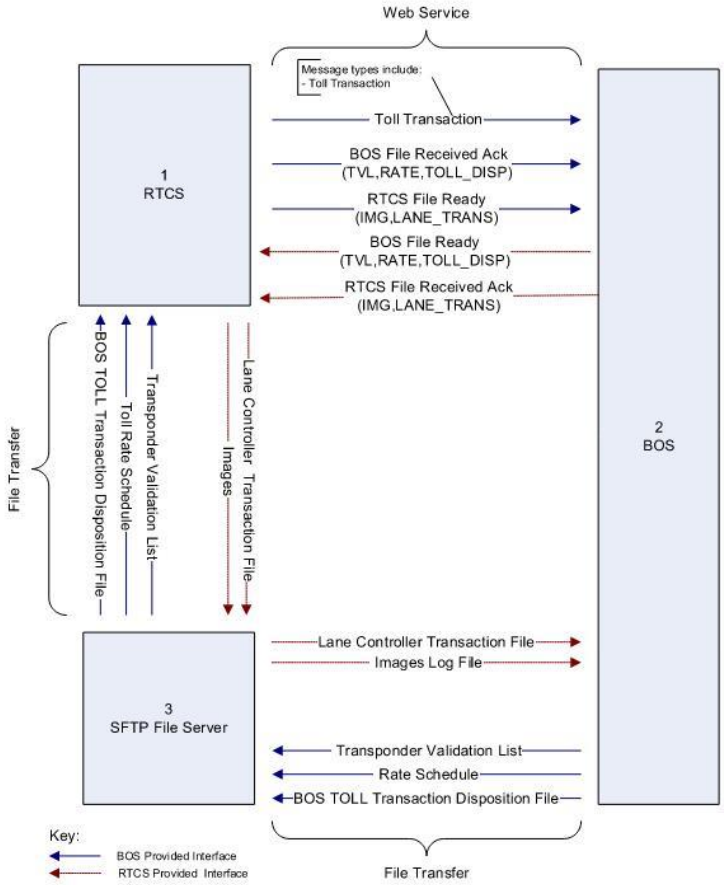


Figure 1: Overview Process Flow

2.1.1. Overview Process Flow Explanation

RTCS

- RTCS invokes BOS Web Service requests to send the appropriate event information to the BOS. These events include the following:
  - Toll transactions
  - RTCS File Ready
  - BOS File Acknowledgments
- RTCS Invokes BOS Web Service requests to send appropriate event information to the BOS. BOS receives and processes the Web Service requests. The conclusion of the RTCS request processing includes the BOS sending an individual Acknowledgement reply to the RTCS based upon the specific Web Service request processed.
- RTCS generates and places files on the SFTP File Server for retrieval by BOS. These files include the following:
  - Lane Controller Transaction File
    - Utilized for transaction level reconciliation between the RTCS and BOS.
  - Images Log File
    - Used for Image level reconciliation between the RTCS and BOS.

BOS

- BOS invokes RTCS Web Service requests to send appropriate event information to RTCS. These events include the following:
  - BOS File Ready
  - RTCS File Acknowledgments
- BOS invokes RTCS Web Service requests to send appropriate event information to the RTCS. RTCS receives and processes the Web Service requests. The conclusion of the BOS request processing includes the RTCS sending an individual Acknowledgement reply to the BOS based upon the specific Web Service request processed.
- BOS generates and places files on the SFTP File Server for retrieval by RTCS. These files include:
  - Tag Validation Lists (TVL – IAG and ORB)
  - Rate Schedule
  - BOS TOLL Transactions Dispositions

  The BOS generates and places each file on the SFTP File Server based on a specific schedule defined for each file.
  Similarly, the BOS retrieves images from the SFTP File Server based on a separate schedule.

General

- The SFTP File Server receives and stores the files from the RTCS and the BOS. The RTCS retrieves and processes the files from the SFTP File Server delivered to the SFTP file Server by the BOS. The RTCS will subsequently send a File Acknowledgment via Web Service to the BOS as needed to acknowledge specific file receipt and processing. Each specific file type specifies the requirement for sending a File Acknowledgment.
- Likewise, the BOS retrieves and processes the images from the SFTP File Server delivered by the RTCS. The BOS will subsequently send a File Acknowledgment via Web Service to the RTCS as needed to

acknowledge specific file receipt and processing. Each specific file type specifies the requirement for sending a File Acknowledgment.

2.2. Web Service Interface Process Flow

The Web Service interface process flow includes the tasks and steps shown in the table below.

Table 2: Web Service Process Flow Tasks

Task	Description
RTCS Web Service Request	Once a new transaction is created, the RTCS sends the Web Service request containing this information to the BOS.
BOS Processes Web Service Request	BOS receives, parses, and evaluates the request message. If an issue is found, an alert is generated for support staff.
BOS Sends Acknowledgement	BOS sends an acknowledgement reply to the RTCS.
RTCS Processes Acknowledgment Reply	RTCS receives, parses, and evaluates the reply message. If an issue is found, the message is corrected, and the Web Service request is resent.

The following flow diagram depicts the Web Service interface process flow:

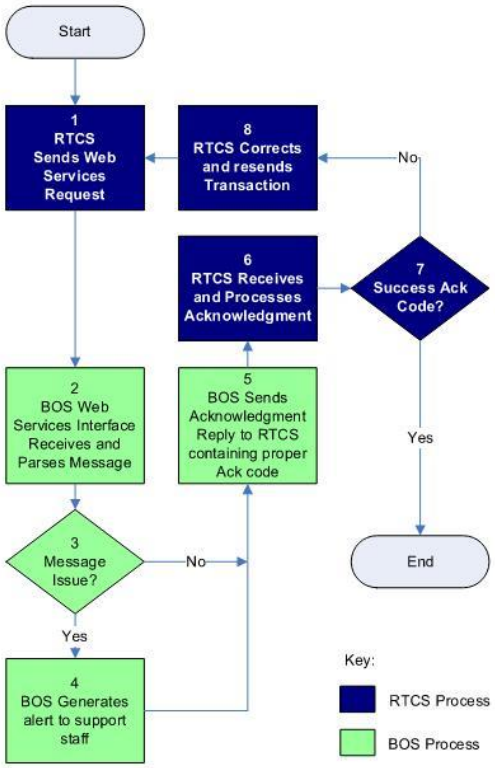


Figure 2: Web Service Interface Process Flow

2.2.1. Web Service Process Flow Explanation

1. RTCS invokes the BOS Web Service request to send the appropriate transaction information to the BOS.
2. BOS receives the Web Services request and parses the message.
3. BOS evaluates the message based on the checks below:
   - Required data elements have been specified
   - Data elements are of the proper data type and range as specified in the XML Schema Definition (XSD)
   - No duplicate transaction. If there is a transaction for the same tag or license plate (license plate number and license plate state) on the account that matches the same plaza, in the same direction, within a configurable period, then the second transaction shall be considered a duplicate transaction.
4. If message failure checks, outlined in step 3, exceed a configurable threshold per hour (1000 by default) a BOS alert is created and sent to support staff. At the beginning of every hour the failure count is set to zero (0).
5. BOS sends an Acknowledgment reply with the appropriate acknowledgment code (Success or Failure condition) to the RTCS. The table below lists the Acknowledgement code ranges. A detailed list of codes can be found in *Appendix B — Response Codes and Messages*.

Table 3: Web Service Acknowledgement Code Ranges

Ack Code Range	Ack Message
0	Success
101 - 109	System/Request Validation error

6. RTCS receives and processes the acknowledgment.
7. RTCS evaluates the Ack Code returned. If the code is Success the process ends.
8. If the Ack Code returned is a failure condition, the RTCS vendor shall resolve the issue and resend the request. Step 1 is then performed again.

3. System Interfaces

3.1. Protocol

The protocols for the exchange of data used in this ICD are Web Services/HTTPS for the Web Service and File Transfers/SFTP for file data transfer. The interfaces covered in this version of the document include the Toll Transactions Web Service. The table below lists all message types that shall be added to this document for the completion of the specification:

Table 4: Message Types

Message Type	Format	Push / Pull	Method / Protocol	Frequency
Toll Transaction	XML	RTCS Push to BOS	Web Service / HTTPS & SOAP	Continuously – 24/7
Transponder Validation List	TXT	BOS Push to RTCS	File Transfer / SFTP	Full – Once per day for every IAG agency and the ORB TVL for the ORB tags, prior to 4am Incremental – Every 15 minutes, excluding the period from 3am to 4am
Images	Jpeg	RTCS Push to shared network location.	File Transfer	Continuously – 24/7
Rate Schedule	TXT	BOS Push to RTCS	File Transfer / SFTP	As needed
BOS File Acknowledgement	XML	RTCS Push to BOS	Web Service / HTTPS & SOAP	BOS Web Service called by RTCS as needed with file download
RTCS File Ready	XML	RTCS Push to BOS	Web Service / HTTPS & SOAP	BOS Web Service called by the RTCS when a new file is ready to be retrieved.
RTCS File Acknowledgement	XML	BOS Push to RTCS	Web Service / HTTPS & SOAP	RTCS Web Service called by BOS as needed with file download
BOS File Ready	XML	BOS Push to RTCS	Web Service / HTTPS & SOAP	RTCS Web Service called by BOS when a new file is ready to be retrieved.
BOS RTCS TOLL Disposition File	CSV	BOS Push to RTCS	File Transfer/SFTP	Daily file generated by BOS and sent to RTCS to notify the daily disposition status of the received toll transactions.

Note: XML for Toll Transactions only.

3.2. Web Service Interfaces

Web Service discussed within this section use HTTPS protocol using various Web Service methods. The data is transferred in XML format and follows the Second Edition of XML Schema documented at:
http://www.w3.org/TR/xmlschema-0/

3.2.1. Toll Transactions

When transactions occur in the lane for vehicle, messages the RTCS creates a toll transaction request utilizing the information in this section. The TollTransactionService is to be used by the RTCS to transfer all required and available optional information for the lane transaction types to the BOS.

A MessageID field within the Web Service identifies the type of message. The valid MessageID values include:

- "TOLL" – Toll Transactions

3.2.1.1. Toll Transaction Naming Conventions

TollTransactionService is the name of the service to be used to transfer vehicle transactions from RTCS to BOS for processing.

3.2.1.2. Toll Transaction Data Transfer

Transactions are transferred from RTCS to BOS in XML format using HTTPS protocol. There is a synchronous Web Service call (TollTransactionService.saveTransactionData) for each transaction originated from RTCS. The call is completed with a response from BOS by a transaction response code.

3.2.1.2.1. Toll Transaction Data Transfer – Structure

The structure of each Toll Transaction message follows the general principals listed below. Note that while each message type will have its own list of fields that are required or optional, they will all follow the same basic structure as shown here.

1. All messages require the "BOSLaneInterface" root element.
2. The next element should be named after the Message ID value.
    - Valid values are <TOLL>
3. Common fields for the message type are listed within the Message ID element hierarchy.
4. Specific fields for the record type are listed within an element named after the Record/Transaction Type code.

3.2.1.3. Toll Transaction Data Transmission Method

The data is transferred through a secured HTTPS Web Service method, utilizing SOAP for data exchange, and stored in the BOS database tables.

3.2.1.4. Toll Transaction (TOLL) Request Field Definitions

The table below provides the data elements available in the Toll Transaction request.

Below are the definitions and purpose of each field listed within the table below.

- XML Tag Name: The XML tag name used to identify the data value.
- Required/Optional: Field denotes if a value is required or optional for the XML tag.
    - Required: Value must be provided

- Optional: Tag is not required to be present if it is marked as optional in the ICD.

- Data Type: The data type expected for the XML tag.
- Notes: Additional information specific to the tags use.

Table 5: Toll Transaction Request Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
MessageID	Required	String	4	A code indicating the type of message. • "TOLL" for Toll Transactions
RTCSTransactionID	Required	Long	19	A unique identifier for the transaction generated by the RTCS.
TollScheduleCode	Required	String	10	A unique identifier for the fare schedule in effect when the vehicle transaction occurred.
TVLVersionID	Optional	Int	10	Identifies the Tag Validation List (TVL) in use when the transaction occurred.
FacilityCode	Required	String	4	Identifies the tolling facility. For segment-based transactions, this is the Exit Facility Domain: C.1 *FacilityCodes*
PlazaCode	Required	String	5	Code assigned to the plaza or tolling zone. For segment-based transactions, this is the Exit Plaza Domain: C.2 *PlazaCodes*
LaneNumber	Required	String	3	Identifies the lane within the plaza (or tolling zone). The lane number must be a valid lane number for the specified plaza (or tolling zone). It will validate before the transaction posts to the appropriate BOS account. Range: 1 to 999 Domain: C.3 *Lane ID*

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
TransactionDateTime	Required	Date Time	23	Toll Transaction date and time in the local time zone. (For ORB, it is EST.) Fractions of seconds are required. Toll Collection Systems that do not support fractional seconds should pass zeros for the fractional part. Format: YYYY-MM-DDThh:mm:ss.fff
LogonDateTime	Optional	Date Time	23	Logon date and time in the local time zone. (For ORB it is EST) Fractions of seconds are required. Toll Collection Systems that do not support fractional seconds should pass zeros for the fractional part. Format: YYYY-MM-DDThh:mm:ss.fff Required for Payment Type "GRND"
TollCollectorID	Optional	Int	8	The employee ID of the toll collector. Required for Payment Type "GRND"
BagVaultNumber	Optional	Int	5	Number that uniquely identifies the vault in an ACM lane. Required for Payment Type "GRND"
VaultChamber	Optional	Int	1	Active Vault Chamber Default 0 for Attended Required for Payment Type "GRND"

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
LineOfBusiness	Optional	String	4	Identifies the type of revenue this transaction generated. Valid values are: • "TOLL" - Toll Transactions • "MLCT" – Managed Lane Controller Transactions. (Current RTCS implementation will only require the use of "TOLL". "MLCT" is available for future use as required by the SOW but will not be used by the RTCS.)
PaymentType	Required	String	4	Identifies the primary payment method for the transaction. Domain: C.6 Payment Types
IndicatedClass	Optional	String	2	Vehicle classification entered by the toll collector for cash transactions. Should be 0 when no indicated class detected Domain: C.4 Vehicle Classes
AVCClassification	Required	String	2	Vehicle classification identified by the Automatic Vehicle Classification system in the lane. Should be 0 when no avc class detected Domain: C.4 Vehicle Classes
ForwardAxles	Optional	Int	3	The number of raw forward axles detected.
ReverseAxles	Optional	Int	3	The number of raw reverse axles detected.
AxlesExpected	Optional	Int	3	The number of axles expected based on the classification. Values: 0 – 20 Domain: C.4 Vehicle Classes
FareAmount	Optional	decimal	3, 2	The toll fare amount for this transaction. Required for Cash Lanes (Lane Mode: Toll Collector/Vault). Range: 0.00 to 999.99

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
AvcAxles	Required	Int	3	The number of AVC axles identified. Values: 0 – 20 Domain: C.4 Vehicle Classes
AvcExtraAxles	Optional	Int	3	The number of AVC extra axles identified. Values: 0 – 20 Domain: C.4 Vehicle Classes
TransactionUTCTime	Required	DateTime	23	The transaction date and time in Coordinated Universal Time (UTC)/Greenwich Mean Time (GMT) format. Value: YYYY-MM-DDThh:mm:ss.sssTZD
FeeType	Optional	Int	3	Type of Fee applied, if any. (Not applicable to the RTCS)
FeeAmount	Optional	Double	3, 2	Fee amount applied, if any. Range: 0.00 to 999.99 (Not applicable to the RTCS)
EntryFacilityCode	Optional	String	4	Identifies the entry facility code for segment-based transactions. Required for segment-based transactions. It is not used for non-segment-based transactions. Domain: C.1 FacilityCodes
EntryPlazaCode	Optional	String	5	Identifies the entry plaza for segment-based transactions. Required for segment-based transactions. It is not used for non- segment-based transactions. Domain: C.2 PlazaCodes

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
EntryLaneNumber	Optional	String	3	Identifies the entry lane number for segment-based transactions. Required for segment-based transactions. It is not used for non- segment-based transactions. Range: 1 to 999 Domain: C.3 Lane ID
EntryTransactonDateTime	Optional	DateTime	23	Identifies the local date/time (EST – for ORB) the vehicle entered the facility for segment-based transactions. Required for segment-based transactions. It is not used for non-segment-based transactions. Fractions of seconds are required. Format: YYYY-MM-DDThh:mm:ss.fff
ImagesCaptured	Optional	Int	1	Flag to indicate if images were captured for this transaction. The default is Not Captured (0). Valid states: • 0 – Not Captured • 1 – Captured
TagClass	Optional	String	2	Vehicle classification as identified in the Transponder Validation List. Should be 0 when no transponder class available. When multiple tags are detected, set this to the TagClass of the first Tag in the list or to 0. Domain: C.4 Vehicle Classes
VehicleSpeed	Optional	Int	3	Vehicle speed identified by the lane equipment in miles per hour (MPH). Range: 0 to 999

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
UnusualOccurrenceCode	Optional	String	60	Unusual occurrences attributed to the system. Multiple UO are supported in this strig; Each UO code shall be separated by a ";" semi colon delimiter. Ex. 4;25;26 Domain: C.7 Unusual Occurrence Codes
ReverseDirectionFlag	Optional	Boolean	5	Reverse direction indicator. A true value indicates the traffic was traveling in the reverse direction. Valid values are: True/False Default: False for Payment Type "GRND"
LaneMode	Required	String	3	Operational mode – Indicates the lane mode of operation. Domain: C.5 Lane Modes
ByPassActive	Optional	Int	1	ACM maintenance bypass switch active: • 0 = false • 1 = true Default 0 Required for Payment Type "GRND"
MaintenanceOverride	Optional	Int	1	Maintenance override active: • 0 = false • 1 = true Default 0 Required for Payment Type "GRND"

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
CoinCount1	Optional	Int	4	Number of pennies ($0.01) collected at the ACM for the transaction. Required for Payment Type "GRND" Required for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount2	Optional	Int	4	Number of nickels ($0.05) collected at the ACM for the transaction. Required for Payment Type "GRND"Required for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount3	Optional	Int	4	Number of dimes ($0.10) collected at the ACM for the transaction. Required for Payment Type "GRND" Required for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount4	Optional	Int	4	Number of quarters ($0.25) collected at the ACM for the transaction. Required for Payment Type "GRND" Required for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount5	Optional	Int	4	Number of halves ($0.50) collected at the ACM for the transaction. Required for Payment Type "GRND" Required for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
CoinCount6	Optional	Int	4	Number of dollars ($1.00) collected at the ACM for the transaction. Required for Payment Type "GRND" Required for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount7	Optional	Int	4	For future use Default 0 for Payment Type "GRND" Optional for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount8	Optional	Int	4	For future use Default 0 for Payment Type "GRND" Optional for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CoinCount9	Optional	Int	4	For future use Default 0 for Payment Type "GRND" Optional for ACM Lanes (Lane Mode: Vault). Range: 0 to 9999
CompositeOCRFrontPlateNumber	Optional	String	15	Front LicPlate Number recognized by Composite OCR.
CompositeOCRFrontPlateNumberConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate number. Values: 0 – 99
CompositeOCRFrontPlateState	Optional	String	3	*Front LicPlate State recognized by Composite OCR.*

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
CompositeOCRFrontPlateStateConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate state. Values: 0 – 99
CompositeOCRBackPlateNumber	Optional	String	15	*Back LicPlate Number recognized by Composite OCR.*
CompositeOCRBackPlateNumberConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate number. Values: 0 – 99
CompositeOCRBackPlateState	Optional	String	3	*Back LicPlate State recognized by Composite OCR.*
CompositeOCRBackPlateStateConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate state. Values: 0 – 99
Transponder	Optional	Transponder Type		A complex type that includes all fields that describe a transponder. This supports a list of up to 3 transponders. The transponders are listed in the order in which they need to be prioritized by the BOS processing rules. This data element is required for transponder-enforced transactions, otherwise it is optional. If the RTCS reads a transponder, even if the transponder is invalid, it should be submitted in the transaction.
TransponderId	Optional	String	10	Unique number associated with each transponder of the issuing agency. Value should be empty when there was no transponder read.
IssuingAgencyCode	Optional	String	3	Unique code of the agency which issues the transponders. Required when a transponder is read Domain: C.8 Agency Codes
TransponderProtocol	Optional	String	30	Protocol used in the transponder for toll process.

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
Status	Optional	Int	1	Status Id of the transponder from latest TVL file. If no transponder is read at the lanes, system expects a value of 8 to be received. Domain: C.9 Tag Statuses Tag Statuses
LowBattery	Optional	Boolean	5	Identifies if the transponder has enough battery. Valid only for the battery tags. Valid values are: True/False
RTCSAdditionalData	Optional	RTCSAdditionalDataType		A complex type that includes all fields that are sent by the RTCS for additional data about the transaction. Note that each field below is sent as necessary and are not exclusive. Any combination may be sent and should be processed for a given transaction.
TranResetReleased	Optional	Int	1	Transaction was reset/released Valid states: • 0 - No • 1 –Yes
AttendantReclass	Optional	Int	1	Attendant reclassified vehicle Valid states: • 0 - No • 1 –Yes
ValidAVITagDropped	Optional	Int	1	Valid AVI tag dropped in an attended mode Valid states: • 0 - No • 1 –Yes
EmergencyRunThrough	Optional	Int	1	Emergency run-through vehicle Valid states: • 0 – No • 1 – Yes

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
InvalidAVITagAck	Optional	Int	1	Invalid AVI tag acknowledged in an attended mode Valid states: • 0 – No • 1 – Yes
ValidTagFlush	Optional	Int	1	Valid tag flushed in D/AVI or ACM/AVI mode Valid states: • 0 – No • 1 – Yes
InvalidTagFlush	Optional	Int	1	Invalid tag flushed in D/AVI or ACM/AVI mode Valid states: • 0 – No • 1 – Yes
SecondTagInVehicle	Optional	Int	1	2nd tag in a vehicle Valid states: • 0 – No • 1 – Yes
UOCodeApplied	Optional	Int	1	UO reason applied before or after vehicle run-through Valid states: • 0 – Before • 1 – After
LatePaid	Optional	Int	1	Late Paid Valid states: • 0 – No • 1 - Yes
TransactionCombined	Optional	Int	1	Transaction combined with another Valid states: • 0 – No • 1 – Yes

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
ImagesKept	Optional	Int	1	Images kept for this transaction Valid states: • 0 – No • 1 – Yes
TagClassMismatch	Optional	Int	1	Tag class mismatch flag Valid states: • 0 – No • 1 – Yes
TranFrom2ndORT	Optional	Int	1	Transaction from secondary ORT Valid states: • 0 – No • 1 – Yes
TranFlushedByTimer	Optional	Int	1	Transaction was flushed by time Valid states: • 0 – No • 1 - Yes
EquipmentStatus	Optional	EquipmentStatusType	1	A complex type that details the state of the primary subsystems as well as a few key hardware components when the transaction occurred. Default valid states: • 0 – Normal • 1 – Degraded • 2 - Not Present
AVCStatus	Optional	Int	1	Provides information on the status of the AVC subsystem. If there is an AVC failure, this field shall be used as an exception criterion to be reviewed during the audit process. Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
LaneControllerStatus	Optional	Int	1	RTCS Controller Status - This field indicates if the RTCS controller is operating outside of a "normal" mode. Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
AVIStatus	Optional	Int	1	The status of the AVI subsystem. If there is an AVI failure, this field shall be used as an exception criterion to be reviewed during the audit process. Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
ACMStatus	Optional	Int	1	The status of the ACM equipment. Required if PaymentType is set to "GRND" Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
MLTStatus	Optional	Int	1	The status of the touch-screen MLT. Valid states: • 0 - Normal • 1 - Degraded • 2 - Not Present
VESStatus	Optional	Int	1	The status of the Violation Enforcement System (VES). Valid states: • 0 - Normal • 1 - Degraded • 2 - Not Present

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
CanopyTrafficLight	Optional	Int	1	The status of the canopy light. Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
VehicleofInteresLight	Optional	Int	1	The status of the VIL light. Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
ReceiptPrinterStatus	Optional	Int	1	The status of the receipt printer. Valid states: • 0 - Normal • 1 - Degraded • 2 - Not Present
DDC	Optional	Int	1	Digital Data Converter used to interface LC blade with the peripheral devices for the lane. Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
LiftArm	Optional	Int	1	The status of the Lift Arm (Gate). Valid states: • 0 - Normal • 1 – Degraded • 2 - Not Present
PatronTollDisplay	Optional	Int	1	The status of the Patron Toll Display. Valid states: • 0 - Normal • 1 - Degraded • 2 - Not present

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
ImageList	Optional	ImageListType		A complex type that includes all fields that describe an image set and is required under these conditions: • Violation Event Transaction • The facility is required to provide images for all transactions • The facility is required to provide images for low-balance transactions
ImageCaptureDateTime	Optional	DateTime	23	Image capture date/time for the violation transactions. Fractions of seconds are required. Format: YYYY-MM-DDThh:mm:ss.fff
ImageLocation	Optional	String	256	Directory containing the images.
SelectedROIImageName	Optional	String	64	Image name of the ROI that corresponds with the chosen Image.
ImageName	Optional	String	64	Name of the Image captured. Example: DT_In_Type_#.JPG.
ImageType	Optional	String	6	The image type as defined by one of the following: • FSI = Front Shot Image • BSI = Back Shot Image • FSIROI = Front Shot Image Region of Interest • BSIROI = Back Shot Image Region of Interest • OVRVIW = Overview Image
OcrPlateNumber	Optional	String	15	*LicPlate Number recognized by OCR.*
PrimaryImageFLG	Optional	String	1	*Identifies image as the primary image in the set (Y/N).*
OcrPlateState	Optional	String	3	*LicPlate State recognized by OCR.*
OcrPlateType	Optional	String	20	*LicPlate Type recognized by OCR.*
OcrPlateNumberConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate number. Values: 0 – 99

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
OcrPlateStateConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate state. Values: 0 – 99
OcrPlateTypeConfidence	Optional	Int	2	A value representing the confidence level at which the OCR correctly identified the plate type. Values: 0 – 99

3.2.1.5. Toll Transaction Reply Field Definitions

The table below provides the data elements available in the Toll Transaction reply message for TOLL message types.

Note: Lane ID is not required in the reply here. This reply was designed for cash lane deposits as well that happens at the plaza level, hence not captured in here.

Table 6: Toll Transaction Reply Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
MessageID	Required	String	4	A code indicating the type of message. Valid values: • "TOLL" – Toll Transactions
RTCSTransactionID	Required	Long	19	A unique identifier for the transaction generated by the RTCS.
TransactionDateTime	Required	DateTime	23	Transaction date and time in the local time zone of the RTCS. Fractions of seconds are required. Received from RTCS in the request message. Format: YYYY-MM-DDThh:mm:ss.fff
FacilityCode	Required	String	4	Identifies the tolling facility. Domain: C.1 FacilityCodes
PlazaCode	Required	String	5	Code assigned to the plaza or tolling zone. Domain: C.2 PlazaCodes

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
TollTransactionDateTime	Required	DateTime	23	Toll Transaction date and time in the local time zone of the RTCS. Fractions of seconds are required. Received from RTCS in the request message. Format: YYYY-MM-DDThh:mm:ss.fff
TransactionID	Optional	Int	10	A unique identifier generated in the BOS for this transaction.
ResponseCode	Required	Int	3	Response code retuned. Generated in the BOS for this transaction. Valid Range: 0 – 999 Please refer to B.1 Web Service Response Codes and Messages.
ResponseMessage	Required	String	75	The actual response message. Generated in the BOS for this transaction. Examples: "File Name is missing", "No file is received in the past hour" Please refer to B.1 Web Service Response Codes and Messages.

3.2.1.6. Toll Transaction Fields used in DATABASE

BOS uses the below database fields to map to the ICD fields mentioned in section 3.2.1.4. The list is mentioned here so that RTCS can use just these fields from the available fields in the XSD documents, to minimize the impacts to the BOS database mapping.

Toll Message Section

POS_RANGE_START	LENGTH	COLUMN_NAME
1	4	RECORD_TYPE_ID
2	19	NR_TRANSACTION_ID
3	23	TRANSACTION_DATE
4	4	FACILITY_CODE
5	5	PLAZA_CODE
6	3	LANE_NUMBER
7	10	TOLL_SCHEDULE_CODE

POS_RANGE_START	LENGTH	COLUMN_NAME
8	10	TVL_VERSION_ID
9	8	TOLL_COLLECTOR_ID
10	5	VAULT_NUMBER
11	4	LINE_OF_BUSINESS
12	4	PAYMENT_TYPE
13	2	INDICATED_VEHICLE_CLASS
14	2	AVC_CLASS
15	3	FORWARD_AXLES
16	3	REVERSE_AXLES
17	3	AXLES_EXPECTED
18	6	FARE_AMOUNT
19	3	AVC_AXLES
20	3	AVC_EXTRA_AXLES
21	23	TRANSACTION_UTC_TIME
22	3	FEE_TYPE_1
23	6	FEE_AMOUNT_1
24	4	ENTRY_FACILITY_CODE
25	5	ENTRY_PLAZA_CODE
26	3	ENTRY_LANE_NUMBER
27	23	ENTRY_TRANSACTION_DATE
28	1	IMAGES_CAPTURED
29	2	TAG_CLASS
30	3	VEHICLE_SPEED
31	60	UNUSUAL_OCCUR_CODE
32	1	REVERSE_DIR_FLAG
33	3	LANE_OPEN_MODE_ID
34	4	PENNY_COIN_COUNT_1
35	4	NICKEL_COIN_COUNT_2
36	4	DIME_COIN_COUNT_3
37	4	QUARTER_COIN_COUNT_4
38	4	HALF_COIN_COUNT_5
39	4	DOLLAR_COIN_COUNT_6
40	4	COIN_COUNT_7
41	4	COIN_COUNT_8
42	4	COIN_COUNT_9
43	15	COMP_OCR_FRONT_PLT_NUM
44	2	COMP_OCR_FRONT_PLT_NUM_CONFD
45	3	COMP_OCR_FRONT_PLT_STATE
46	2	COMP_OCR_FRONT_PLT_STA_CONFD
47	15	COMP_OCR_BACK_PLT_NUM
48	2	COMP_OCR_BACK_PLT_NUM_CONFD
49	3	COMP_OCR_BACK_PLT_STATE

POS_RANGE_START	LENGTH	COLUMN_NAME
50	2	COMP_OCR_BACK_PLT_STA_CONFD
51	10	TAG_ID
52	3	ISSUING_TAG_AGENCY
53	30	TRANSPONDER_PROTOCOL
54	1	TAG_STATUS
55	1	TAG_LOW_BATTERY
56	1	TXN_RESET_RELEASED
57	1	ATTENDANT_RECLASS
58	1	VALID_AVI_TAG_DROPPED
59	1	EMERGENCY_RUN_THROUGH
60	1	INVALID_AVI_TAG_ACK
61	1	VALID_TAG_FLUSH
62	1	INVALID_TAG_FLUSH
63	1	MULTIPLE_TAG_IN_VEHICLE
64	1	UO_CODE_APPLIED
65	1	LATE_PAID
66	1	TRANSACTION_COMBINED
67	1	IMAGES_KEPT
68	1	TAG_CLASS_MISMATCH
69	1	TXN_FROM_SECOND_ORT
70	1	TXN_FLUSHED_BY_TIMER
71	1	AVC_STATUS
72	1	LC_STATUS
73	1	AVI_STATUS
74	1	ACM_STATUS
75	1	MLT_STATUS
76	1	VES_STATUS
77	1	CANOPY_TRAFFIC_LIGHT_STATUS
78	1	VEHICLE_OF_INTEREST_LIGHT
79	1	RECEIPT_PRINTER_STATUS
80	1	DIGITAL_DATA_CONVERT_STATUS
81	1	LIFT_ARM_GATE
82	1	PATRON_TOLL_DISPLAY_STATUS
83	23	IMAGE_CAPTURE_DATE_TIME
84	23	LOGON_TIMESTAMP
85	1	VAULT_CHAMBER
86	1	BYPASS_ACTIVE
87	1	MAINTENANCE_OVERRIDE

Image Message Section

POS_RANGE_START	LENGTH	COLUMN_NAME
1	4	RECORD_TYPE_ID
2	64	IMAGE_NAME
3	23	IMG_CAPTURE_DATE_TIME
4	6	IMAGE_TYPE
5	256	IMAGE_LOCATION
6	64	SEL_ROI_IMG_NAME
7	15	OCR_PLATE_NUMBER
8	1	PRIMARY_IMG_FLAG
9	3	OCR_PLATE_STATE
10	20	OCR_PLATE_TYPE
11	2	OCR_PLT_NUMBER_CONFIDENCE
12	2	OCR_PLT_STATE_CONFIDENCE
13	2	OCR_PLT_TYPE_CONFIDENCE

3.2.2. BOS File Acknowledgment

BOS provides a Web Service to accept acknowledgment of file transfers from RTCS. The intent of this Web Service is to provide RTCS a generic Ack/Nak service for file based transfers sent from BOS, including TVL and Rate Schedule.

3.2.2.1. BOS File Acknowledgment

AcknowledgeFileInterface is the name of the service to be used to transfer file transfer acknowledgments from RTCS to BOS for processing.

3.2.2.2. BOS File Acknowledgment Data Transfer

File transfer acknowledgments are transferred from RTCS to BOS in XML format using HTTPS and SOAP protocols. There is a synchronous Web Service call (AcknowledgeFileInterface.sendAcknowledgement) for each file retrieved and processed by RTCS.

3.2.2.3. BOS File Acknowledgment Data Transmission Method

The data is transferred through a secured HTTPS Web Service method, utilizing SOAP for data exchange, and stored in the BOS database tables.

3.2.2.4. BOS File Acknowledgment Request Field Definitions

The table below provides the data elements available in the BOS File Acknowledgment request:

Table 7: BOS File Acknowledgment Request Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
AckCode	Required	String	3	Acknowledgement code retuned. Generated in the BOS for this transaction. Valid Range: 0 – 999
AckMessage	Required	String	75	The actual response message. (i.e., "File Name is missing", "No file is received in the past hour", etc.). Generated in the BOS for this transaction. Please refer to *Response Codes and Messages*.
FacilityCodes	Optional	String	4	Identifies the tolling facility.
PlazaCode	Optional	String	5	Code assigned to the plaza or tolling zone.
InterfaceName	Required	String	50	Indicates which interface is being acknowledged. Valid Values are as follows: TVL, RATE, TOLL_DISP
ReceivedDateTime	Required	DateTime	19	Indicates date the file was received. Format: YYYY-MM-DDThh:mm:ss
FileName	Required	String	75	The full name of the file retrieved.

3.2.2.5. BOS File Acknowledgment Reply Field Definitions

The table below provides the data elements available in the BOS File Acknowledgment reply message for all message types.

Table 8: BOS File Acknowledgment Reply Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
FileName	Required	String	75	The full name of the file retrieved.
ResponseCode	Required	Int	3	Response code retuned. Generated in the BOS for this transaction. Valid Range: 0 – 999 Please refer to B.1 Web Service Response Codes and Messages.

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
ResponseMessage	Required	String	75	The actual response message. Generated in the BOS for this transaction. Examples: "File Name is missing", "No file is received in the past hour" Please refer to B.1 Web Service Response Codes and Messages.

3.2.3. RTCS File Ready

BOS provides a Web Service to allow the RTCS to notify the BOS that a new file is ready for retrieval from the SFTP server.

Note: The RTCS files of Vehicle Transaction Log and the Image List files are documented in their own respective ICDs. The RTCS File Ready and RTCS File ACK services documented here, are used to communicate the availability and the acknowledgment of those files.

3.2.3.1. RTCS File Ready

RTCSFileReadyInterface is the name of the service to be used for notification of new file availability.

Note: The RTCS File ready request is not required for the individual Vehicle Image files captured at the lane.

3.2.3.2. RTCS File Ready Data Transfer

File ready notifications are transferred from RTCS to BOS in XML format using HTTPS and SOAP protocols. There is a synchronous Web Service call (RTCSFileReadyInterface.sendFileReady) for each file made available by the RTCS.

3.2.3.3. RTCS File Ready Data Transmission Method

The data is transferred through a secured HTTPS Web Service method, utilizing SOAP for data exchange, and stored in the BOS database tables.

3.2.3.4. RTCS File Ready Request Field Definitions

The table below provides the data elements available in the RTCS File Ready request:

Table 9: RTCS File Ready Request Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
MessageID	Required	Int	10	Unique identifier for the notification.

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
InterfaceName	Required	String	50	Indicates which file type is being made available. Valid Values are as follows: • IMG • LANE_TRANS Note: IMG refers to the Image log file.
AvailableDateTime	Required	DateTime	19	Indicates the date and time the file was made available. Format: YYYY-MM-DDThh:mm:ss
FileName	Required	String	75	The full name of the file made available.
FilePath	Required	String	300	The sftp server path where the file is place. LANE_TRANS /files/RTCS/host/lane/received IMG /files/RTCS/image_log/inbound

3.2.3.5. RTCS File Ready Reply Field Definitions

The table below provides the data elements available in the RTCS File Ready reply message for all message types.

Table 10: RTCS File Ready Reply Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
MessageID	Required	Int	10	Unique identifier for the notification.
FileName	Required	String	75	The full name of the file made available.
ResponseCode	Required	Int	3	Response code retuned. Generated in the RTCS for this transaction. Valid Range: 0 – 999 Please refer to B.1 *Web Service Response Codes and Messages*.
ResponseMessage	Required	String	75	The actual response message. Generated in the RTCS for this transaction. Examples: "File Name is missing", "No file is received in the past hour" Please refer to B.1 *Web Service Response Codes and Messages*.

3.2.4. RTCS File Acknowledgment

RTCS provides a Web Service to accept acknowledgment of file transfers from BOS. The intent of this Web Service is to provide BOS a generic Ack / Nak service for file based transfers sent from RTCS.

3.2.4.1. RTCS File Acknowledgment

RTCSAcknowledgeFileInterface is the name of the service to be used to transfer file transfer acknowledgments from BOS to RTCS for processing.

3.2.4.2. RTCS File Acknowledgment Data Transfer

File transfer acknowledgments are transferred from BOS to RTCS in XML format using HTTPS and SOAP protocols. There is a synchronous Web Service call (RTCSAcknowledgeFileInterface.sendAcknowledgement) for each file retrieved and processed by BOS.

3.2.4.3. RTCS File Acknowledgment Data Transmission Method

The data is transferred through a secured HTTPS Web Service method, utilizing SOAP for data exchange, and stored in the RTCS database tables.

3.2.4.4. RTCS File Acknowledgment Request Field Definitions

The table below provides the data elements available in the RTCS File Acknowledgment request:

Table 11: RTCS File Acknowledgment Request Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
AckCode	Required	String	3	Acknowledgement code retuned. Generated in the RTCS for this transaction. Valid Range: 0 – 999
AckMessage	Required	String	75	The actual response message. (i.e., "File Name is missing", "No file is received in the past hour", etc.). Generated in the RTCS for this transaction. Please refer to *Response Codes and Messages*.
InterfaceName	Required	String	50	Indicates which interface is being acknowledged. Valid Values are as follows: IMG, LANE_TRANS

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
ReceivedDateTime	Required	String	19	Indicates date the file was received. Gregorian Calendar format as required by the XSD:DateTime data type. Format: MM/DD/YYYY HH24:MI:SS
FileName	Required	String	75	The full name of the file retrieved.

3.2.4.5. RTCS File Acknowledgment Reply Field Definitions

The table below provides the data elements available in the RTCS File Acknowledgment reply message for all message types.

Table 12: RTCS File Acknowledgment Reply Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
FileName	Required	String	75	The full name of the file retrieved.
ResponseCode	Required	Int	3	Response code retuned. Generated in the RTCS for this transaction. Valid Range: 0 – 999 Please refer to B.1 *Web Service Response Codes and Messages*.
ResponseMessage	Required	String	75	The actual response message. Generated in the RTCS for this transaction. Examples: "File Name is missing", "No file is received in the past hour" Please refer to B.1 *Web Service Response Codes and Messages*.

3.2.5. BOS File Ready

RTCS provides a Web Service to allow the BOS to notify the RTCS that a new file is ready for retrieval from the SFTP server.

3.2.5.1. BOS File Ready

BOSFileReadyInterface is the name of the service to be used for notification of new file availability.

3.2.5.2. BOS File Ready Data Transfer

File ready notifications are transferred from BOS to RTCS in XML format using HTTPS and SOAP protocols. There is a synchronous Web Service call (BOSFileReadyInterface.sendFileReady) for each file made available by the BOS.

3.2.5.3. BOS File Ready Data Transmission Method

The data is transferred through a secured HTTP Web Service method, utilizing SOAP for data exchange and stored in the RTCS database tables.

3.2.5.4. BOS File Ready Request Field Definitions

The table below provides the data elements available in the BOS File Ready request:

Table 13: BOS File Ready Request Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
MessageID	Required	Int	10	Unique identifier for the notification.
InterfaceName	Required	String	50	Indicates which file type is being made available. Valid Values are as follows: • TVL, RATE, TOLL_DISP, IMGREV
AvailableDateTime	Required	String	19	Indicates the date and time the file was made available. Gregorian Calendar format as required by the XSD:DateTime data type. Format: MM/DD/YYYY HH24:MI:SS
FileName	Required	String	75	The full name of the file made available. In case of InterfaceName of IMGREV, the RTCSTransactionID will send to the TCS as the unique identifier of the toll message that is requested for Image re-review.
FilePath	Required	String	300	The sftp server path where the file is place. TVL /files/RTCS/ha/tvl/transfer/ RATE /files/RTCS/facsserver/rate_schedule/inbound TOLL_DISP /files/RTCS/toll_disp/transfer In case of InterfaceName of IMGREV, the FilPath is a dummy path value of /dummy

3.2.5.5. BOS File Ready Reply Field Definitions

The table below provides the data elements available in the BOS File Ready reply message for all message types.

Table 14: BOS File Ready Reply Data Elements

XML Tag Name	Required/ Optional	Data Type	Max Length	Notes
MessageID	Required	Int	10	Unique identifier for the notification.
FileName	Required	String	75	The full name of the file made available.
ResponseCode	Required	Int	3	Response code retuned. Generated in the BOS for this transaction. Valid Range: 0 – 999 Please refer to B.1 Web Service Response Codes and Messages.
ResponseMessage	Required	String	75	The actual response message. Generated in the BOS for this transaction. Examples: "File Name is missing", "No file is received in the past hour" Please refer to B.1 Web Service Response Codes and Messages.

3.3. File Based Transfers

File based transfers discussed within this section use File Transfer Protocol (FTP).

3.3.1. Images

The RTCS collects video images of vehicles on the toll road. These images are used for violation event transactions. Detailed information about the images is recorded in the toll transaction data exchange.

Images are pushed by the Roadside to the shared BOS SFTP File Server.

3.3.1.1. Transfer Protocol

The RTCS will place images in a shared network location for BOS use.

3.3.1.2. Compression

Images are not compressed. Jpeg images do not benefit from compression.

- **Note**: Because this field is fixed length, each of the two values in this field are right-justified and zero padded. (Example: The value 00120115 represents pixel columns 12 (left most) and 115 (right most).)

- <Plate_ROI> Sent as 0000000000000000
  - Plate ROI coordinates:
  - This 16-digit field consists of four, four-digit values representing the position of the vehicle license plate in the image. The first eight (8) digits represent the pixel coordinates of the upper left most pixel position of the plate, and the last eight (8) digits represent the pixel coordinates of the lower right most pixel position of the plate.
  - **Note**: Because this field is fixed length, each of the four values in this field are right-justified and zero padded. (Example: The value 0512026106350275 represents pixel coordinates 512, 261 (upper left corner) and 635, 275 (lower right corner).)
- <OSR_Conf> = ### Confidence Number [3 Char – 000 to 100 (right-justified, zero filled)]
- <OSR> = ST State determined by OSR processing (2 char – if
  - OSR is not known or No OSR system is available,
  - then the default value shall be set to '00')
- <Plate_Type> = PLT Indication of the type of Plate for the given State
  - (3 Char – 000 to 999, if Plate Type is unknown or
  - not supported then the default value is '000')
- <OCR_Conf> = %%% Confidence indicator of OCR [3 Char – 000 to 100 (right-justified, zero filled)]
- <OCR> = CCCCCCC License number determined by OCR processing
  - (variable 7 Char – if less than 7 characters, then no leading or trailing characters are specified; no spaces used

3.3.1.4. Directory Structure

The directory structure is formed using the following format and be used to populate the TOLL transaction ImageLocation data element.

/images/YYYYMMDD/PLAZA Code/LANE ID

- The first level of the directory structure is "images" in order to keep all images in a single container.
- The second level shall be the date of image upload using the YYYYMMDD format.
- The third level shall be the alphanumeric PLAZA_CODE which is a maximum of five characters.
- The fourth level shall be the numeric LANE_ID.

The examples below represent this folder structure using the ABCDE Plaza:

- images/20100727/ABCDE/02
- images/20100727/ABCDE/03
- images/20100727/ABCDW/02
- images/20100727/ABCDW/03

3.3.2. Rate Schedule

The Rate Schedule is maintained by the BOS and transmitted to the shared BOS SFTP File Server for processing. It contains the toll rates in effect for each vehicle class.

This file is used by the RTCS to identify the current toll rate for vehicle classes utilizing the roadway for plaza location, day of week and time of day periods while in operation.

3.3.2.1. Frequency

The Rate Schedule file is pushed from the Back Office System to the shared BOS SFTP File Server as needed.

The BOS vendor will call the RTCS provided FileReady web service method when a new file has been created and is ready for processing to formally notify the RTCS that the file is available.

3.3.2.2. Transfer Protocol

Secure File Transfer Protocol (SFTP) is used for all Rate Schedule transfers between the Back Office System and the shared BOS SFTP File Server.

Once the RTCS has retrieved and processed the file, it will call the BOS TollTransactionService.sendAcknowledgement Web Service and provide the appropriate post processing value from Table 21: BOS File Acknowledgment Codes and Messages.

3.3.2.3. File Archival

Rate Schedule files are retained on the shared BOS SFTP File Server for a period of 30 days.

The RTCS Vendor is responsible for purging Rate Schedule files that are older than 30 days.

3.3.2.4. File Type

Rate Schedule file is an ASCII text file.

3.3.2.5. Naming Convention

[FILE_DATE_TIME]_Rate_Schedule.txt

Example: For a Rate Schedule File created on June 19, 2006, at 02:00:05 the name of the file is:

20060619020005_Rate_Schedule.txt

3.3.2.6. Directory Structure

The first level of the directory structure is “rate_schedule”. Rate Schedule files are pushed to the rate_schedule/inbound directory. As rate schedule files are processed, they are moved to the rate_schedule/processed directory. Files that have issues during processing are moved to the rate_schedule/error directory. The RTCS Vendor is free to create additional directories as needed, but these 3 directories must exist.

3.3.1.3. Naming Convention

Images are named in a unique manner by the RTCS Vendor. The image names are specified in the toll transaction. The image name shall be in UPPER case.

The file name for the image files shall have the following format:

<State_Abbrev><Authority><Plaza><Lane><Year><Month><Day><Hour><Min><Sec><Sequence><lane_sequence_no><ImageNumber>_<Vehicle_ROI>_<Plate_ROI>_<OSR_Conf><OSR><Plate_Type>_<OCR_Conf><OCR>.JPG

Note: If the RTCS vendor supplies vehicle region of interest (ROI), plate ROI, OSR and/or OCR values, the <Vehicle_ROI>, <Plate_ROI>, <OSR_Conf>, <OSR>, <Plate_Type>, <OCR_Conf> and <OCR> fields must be provided (with default values if applicable). Except for the <OCR> field, these optional fields listed above are fixed length.

- <State_Abbrev> = SS = "IL" (2 Char, shall always = "IL")
- <Authority> = AAA = "088" (3 Char)
- <Plaza> = PPPP = "0001" (4 Char) ; use 0001 for FRBCE and 0002 for FRBCW
- <Lane> = LL = "01" (2 Char)
- <Year> = YYYY (4 Char)
- <Month> = MM (2 Char)
- <Day> = DD (2 Char)
- <Hour> = HH (2 Char)
- <Min> = MI (2 Char)
- <Sec> = SS (2 Char)
- <Sequence> = QQQQQ = "12345" (5 Char, combination of "QQQQQ" and all other values defined above shall make the BaseFileName field unique per record)
- <lane_sequence_no> = '9999999999999999999' (19 Char)
- <ImageNumber> = _1 or _A (2 char – 1 underscore and a number for front camera or Overview images, or 2 char – 1 underscore and a letter for rear images) - for Violations or LP for License Plate captures.

Examples: Shown by breaking down in the individual elements

```
TX 116 0076 05 2021 02 23 173559 74635 76052102231735596 35 _1.JPG
TX 116 0076 05 2021 02 23 173559 74635 76052102231735596 35 _A.JPG
```

Note: The date and time information captured in the image file name shall match the date and time information of the associated transaction.

The following optional fields are provided only when vehicle ROI, plate ROI, OSR and/or OCR information is being provided. Because the following fields are fixed length, any missing fields, except the <OCR> field, must be zero filled (default value).

- <Vehicle_ROI> Sent as 00000000 now
  - Vehicle ROI coordinates:
  - This 8-digit field consists of two, four-digit values representing the position of the vehicle in the image. The first four (4) digits represent the left most pixel column, and the last four (4) digits represent the right most pixel column.

Here is an example of the directory structure:

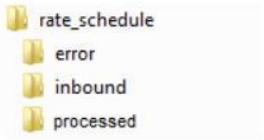


Figure 3: Rate Structure

3.3.2.7. File Format

Rate Schedule file is modeled after a Microsoft Windows INI file.

- **Section Heading** – Section Heading is contained in square brackets ("[ ]").
- **Parameter** – Parameters are identified by the first keyword on a line, followed by an equal sign ("="), then the parameter value.
- **Comment** – Comment begins with a semi-colon (";"). Any text following a semi-colon on a line is ignored.
- Section Heading and parameter are not case-sensitive.

A Rate Schedule file contains a header and three sections:

- Header definition: "; Created MM/DD/YYYY HH24:MI:SS";
- Fare structure definition: "[FareStructure]" section;
- 7-day, 24-hours schedule definitions: "[Schedule-Fare]" section;
- Plaza to Schedule mappings: "Plaza-Schedule]" section;

A Rate Schedule file may contain multiple fare structures, schedule definitions, and plaza-to-schedules mappings. Each schedule definition section heading begins a new rate schedule and spans an entire 7-day, 24-hour period. A simple rate schedule for the entire period may be represented as the example below:

Day Of Week	Hour of the Day																					
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
S	$1.00																							
M	$1.00						$2.50						$1.00					$2.50			$1.00			
T	$1.00																							
W	$1.00																							
T	$1.00																							
F	$1.00						$2.50						$1.00					$2.50			$1.00			
S	$1.00																							

In text format, the above schedule is represented as:

Start		End		Fare
Day	Time	Day	Time	
SUN	00:00	MON	06:00	$1.00
MON	06:00	MON	09:00	$2.50
MON	09:00	MON	16:00	$1.00
MON	16:00	MON	19:00	$2.50
MON	19:00	FRI	06:00	$1.00

FRI	06:00	FRI	09:00	$2.50
FRI	09:00	FRI	16:00	$1.00
FRI	16:00	FRI	19:00	$2.50
FRI	19:00	SUN	00:00	$1.00

Notice, Sunday midnight is Day SUN, 00:00. As an end point, the Saturday/Sunday midnight boundary is specified as Day SUN, 00:00. The schedule must begin on Day SUN, 00:00 and end on Day SUN, 00:00.

3.3.2.8. Record Format

3.3.2.8.1. [FareStructure] Section

The FareStructure section specifies the fare due by vehicle class and payment type.

This section contains the following parameters:

```
[FareStructure]                ; Section heading
FareID=<fare-id>               ; numeric identifier for this fare
                               ;  structure ranging from 1 to 65535.
Fare=<class>, <payment-type>, <fare-amount> [, <per-axle-fare>]
                               ; where:
                               ;   class = vehicle class
                               ;   payment type = 1 = CASH (type 1)
                               ;                  2 = AVI(type 2)
                               ;
                               ;   fare amount = minimum fare due for
                               ;      class (implied decimal)
                               ;      e.g., 100 = $1.00
                               ;   per-axle-fare = per axle charge if
                               ;      fare based upon axle count
                               ;      (default 0, optional)
```

```
                              ; Multiple Fare keywords are allowed
                              ;   per section
```

Business Rules:

- Only one FareID is allowed per section
- The FareID should be the first entry in the section
- Any vehicle class-payment type combination omitted from this section is assumed to have a value of zero
- A new fare schedule definition begins with another [FareStruture] section heading

3.3.2.8.2. [Schedule-Fare] Section

The Schedule-Fare Section maps a set of fare definitions to a 7-day, 24-hour/day period. The association to a given plaza is specified in the Plaza-Schedule Section described later in this document.

This section contains the following parameters:

```
[Schedule-Fare]               ; Section heading
ScheduleID=<schedule-id>      ; numeric identifier for the schedule
                              ;   ranging from 1 to 65535[1]. Schedule ID 0
                              ;   is reserved for legacy rate schedules
                              ;   that do not support variable pricing
Period=<start-day>,           ; starting day:
                              ;   SUN = Sunday
                              ;   MON = Monday
                              ;   TUE = Tuesday
                              ;   WED = Wednesday
                              ;   THU = Thursday
                              ;   FRI = Friday
                              ;   SAT = Saturday
   <start-time>,              ; start time of price segment
                              ;   format HH:MM (24-hr)
```

```
<end-day>,                ; ending day (same abbreviations as
                          ;  start-day)
<end-time>,               ; end time of price segment
                          ;  format HH:MM (24-hr)
<fare-id>                 ; applicable fare ID, the fare ID must
                          ;  defined in a previous FareStructure
                          ;  Section.
                          ;  Multiple Period keywords are allowed
                          ;  per section.
```

Business Rules:

- Only one ScheduleID is allowed per section
- The ScheduleID should be the first entry in the section
- Each "Period=" line contains an effective time range and an associated fare structure
- The time is specified as HOUR:MINUTE. The implication is :00 seconds
- The entire 7-day period is specified as starting "SUN, 00:00" and ending "SUN, 00:00". If a fare schedule is omitted from a specified period, the fare amount is set to zero
- A new schedule begins with another [Schedule-Fare] section heading

3.3.2.8.3. [Plaza-Schedule] Section

The Plaza-Schedule Section specifies active schedule for a given plaza. This section contains the following parameters:

```
[Plaza-Schedule]          ; Section heading
Plaza=<facility code>,    ; 4-char facility ID
   <plaza code>,          ; 5-char plaza ID
   <lane_code>,           ; 3-char lane ID
   <direction>,           ; travel direction (N, S, E, W)
   <effective date/time>, ; start date of rate
                          ;   format MM/DD/YYYY HH:MM (24-hr)
   <expiry date/time>,    ; date rate expires
                          ;   format MM/DD/YYYY HH:MM (24-hr)
                          ;   99/99/9999 23:59 = no expiration
```

```
<schedule-id>              ; Schedule ID
```

Business Rules:

- Multiple schedules may be specified for a given plaza. This file processes from start to finish by the lane. The lane uses the last schedule in the file specified for a given plaza with an applicable time. This allows an override schedule to be appended to the section which would preempt a prior schedule. For example, to override a schedule for July 4th, 2006 a portion of the Lane Variable Rate File might be:

```
[Plaza-Schedule]    ; Section heading

   ; The following line is the "default schedule"

   Plaza=ABC, MLP1, 01, N, 01/01/2004 00:00, 99/99/9999 23:59, 1

   ; The following line would override the schedule for 1 day

   Plaza=ABC, MLP1, 01, N, 07/04/2006 00:00, 07/05/2006 00:00, 2
```

In the above example, Schedule 1 is active from January 1st, 2004, with no end time specified. However, at midnight July 4th, 2006, Schedule 2 becomes active until midnight July 5th, 2006. At midnight July 5th, 2006, Schedule 2 terminates, and Schedule 1 becomes active once again.

- The "Plaza=" entry is repeated multiple times in this section to specify the schedule applicable to multiple plazas and lanes.

3.3.3. BOS RTCS TOLL Disposition File

The BOS TOLL Disposition file shall be generated by BOS and transmitted to the shared BOS SFTP File Server for processing. It shall contain all the toll transactions sent by the RTCS to the BOS that have occurred before the file is generated.

The toll transactions shall have the key fields that are detailed in the table below and as of date disposition status in the BOS. The disposition status and the workflow state of the transaction for any given transaction, shall be the last state that the transaction changed to for that day. That means, a toll transaction is present in the file only once on any given day.

This file is used by the RTCS to keep an audit of the current disposition of the toll transaction that have been sent to the BOS via the webservice.

3.3.3.1. Toll Disposition File Naming Conventions

Toll Disposition file names will use the following format. The data/time is the time when the file was created.

{plaza abbrev}_TOLL_{YYYYMMDDHHMISS}.csv

Example: ABCDE_TOLL_20210201001001.csv

3.3.3.2. Toll Disposition File Delivery Location

The files are placed in the sent folder by the BOS. After RTCS is done processing the file, the files are moved to the archive folder or the error folder depending on the processing status.

The table below lists the file locations and the status of the files within each directory.

Table 15: Toll Disposition File Delivery Locations

Directory	Status
files/RTCS/toll_disp/transfer	Contains final file for TCS to pick up
files/RTCS/toll_disp/archive	Files are moved to this location by TCS once they are consumed
files/RTCS/toll_disp/temp	Used by BOS as temp location while writing the file

3.3.3.3. Toll Disposition File Delivery Timetable

The Toll Disposition file shall be generated, once, every day past midnight for the toll transactions and dispositions that occurred on the previous day.

3.3.3.4. Toll Disposition File Transfer Protocol

Secure File Transfer Protocol (SFTP) is used for to transfer the files between the Back Office System and the shared BOS SFTP File Server.

BOS shall create the file and place it on the shared SFTP server and then call the BOSFileReady webservice with InterfaceName of "TOLL_DISP" to notify about the availability of the file to RTCS.

RTCS shall process the file and then call the BOS File Acknowledgement webservice with the InterfaceName of "TOLL_DISP" to notify the BOS that the file has been processed.

3.3.3.5. Toll Disposition File Field Definitions

This section provides information for the header and detail records in the file.

3.3.3.5.1. Toll Disposition File Header Record

The following data elements are accepted in the header record of the file:

The table below lists the Toll Disposition file Header Fields.

Table 16: Toll Disposition File Header Fields

Description	Type	Max Length	Terminator	Example	Rec Ver
File type	Alpha	9	,	TOLL_DISP = Toll Transaction Disposition	1
Disposition DateTime First record	Date/Time	19	,	"01/30/2000 14:45:37"	1
Disposition DateTime Last record	Date/Time	19	,	"01/30/2000 14:45:37"	1
Number of transactions	Numeric	20	,	Transaction count in file	1

3.3.3.5.2. Toll Disposition File Detail Record

The following data elements are accepted in the detail record of the file:

Table 17: Toll Disposition File Details Fields

Description	Type	Max Length	Terminator	Example	Required
TxnDetailId	Numeric	14	,	Unique id for reach record within the file	Y
DispositionDate	Date/Time	19	,	Date time the disposition was recorded	Y
TransactionID	Numeric	14	,	BOS assigned unique identifier for the transaction.	Y
RTCSTransactionID	Numeric	19	,	This is a unique identifier for the transaction generated by the RTCS.	Y
FacilityCode	Alpha	4	,	4-character code	Y
PlazaCode	Alpha	5	,	5-character code	Y
LaneNumber	Alpha	3	,	Lane number	Y
TransactionDateTime	Date/Time	23	,	"01/30/2000 14:45:37.123"	Y
AVCClass	Alpha	2	,	Class of the vehicle detected at the lane	Y
LCFareAmount	Numeric	5	,	Fare associated with revenue vehicle class, implied 2 decimal positions. This is the original fare amount sent by RTCS	Y
PaymentType	Alpha	4	,	Refer to Appendix C6 for Payment type definitions	Y
TransactionStatus	Alpha	1	,	BOS Internal high-level status of the transaction, indicating the state. This status is visible to the end user. Refer to the Appendix C10; BOS Transaction Statuses	Y
TxnWorkflowState	Numeric	14	,	BOS Internal workflow state ID indicating the processing stage of the transaction. Refer to the Appendix C12; BOS Workflow state ID	Y
TransponderId	Alpha	10	,	Unique number associated with each transponder of the issuing agency.	N
IssuingAgencyCode	Alpha	3	,	Tag authority/agency that issued the transponder	N

Description	Type	Max Length	Terminator	Example	Required
PostedRevenue	Numeric	5	,	Fare that the transaction got posted at, to the account. implied 2 decimal positions	N
OpenAmt	Numeric	5	,	Current Open amount on the toll transaction; implied 2 decimal positions	Y
PaidAmt	Numeric	5	,	Current Paid amount on the toll transaction; implied 2 decimal positions. Is the same as posted revenue for tag based transactions.	N
UncollectableAmt	Numeric	5	,	Amount that is excused or adjusted Ex. toll on the invoice is being disputed.	N
LicensePlateNumber	Alpha	15	,	License Plate number after review	N
LicensePlateState	Alpha	3	,	License Plate state after review	N
LicensePlateType	Alpha	10	,	License Plate type after review	N
IsInvoiced	Alpha	1	,	Y-indicates the toll is on an invoice else N	N

3.3.4. Alert Plates

The Alert plates lists are created to handle more unique situations such as Amber alerts, stolen vehicles, and kidnapping. See *C.13 Alert Plate Types*. The incident management team configures alert plates in the system. A file is generated and sent to the appropriate directories for the roadway system to retrieve. The Alert Plate List is generated daily and any time there is a change in alert plates list. Similarly, to the top prohibited list, the roadway system analyzes images coming from the lanes and determines if a vehicle image matches an alert plate in the Alert Plate Lists. If a match is found, the roadway system sends an email to the dispatch team. The dispatch team then determines if the vehicle should be intercepted by an officer on the roadway.

3.3.4.1. Frequency

The Alert Plates file is pushed from the Back Office System to the shared BOS SFTP File Server as needed.

3.3.4.2. Transfer Protocol

The BOS will place the Alert Plate list file in a shared network location for RTCS use.

3.3.4.3. File Archival

Alert Plate files are retained on the shared BOS SFTP File Server for a period of 30 days.

The RTCS Vendor is responsible for purging Alert Plate files that are older than 30 days.

3.3.4.4. File Type

The Alert Plate file is an ASCII text file.

3.3.4.5. Naming Convention

YYYYMMDDHH24MISS_ManualAlertPlate.txt

Example: For an Alert Plate File created on June 19, 2006, at 02:00:05 the name of the file is:

20060619020005_ManualAlertPlate.txt

3.3.4.6. Directory Structure

The Alert Plate file will be placed on the following SFTP directory:

/files/RTCS/facsserver/alertplateslist

3.3.4.7. Field Definitions

The table below contains the field description for the Alert Plate file.

Table 18: Alert Plate Field Description

Field Name	Type	Max Length	Description	Required
Plate Number	Char	10	License Plate#	Y
Jurisdiction	Char	2	License Jurisdiction	Y
License Type Code	Char	30	License Type Code	Y
Tag Agency	Char	10	Tag Agency	N
Tag Serial Number	Char	10	Tag Serial Number	N
Alert Type	Char	30	Type of Alert	Y
Vehicle Make	Char	15	Make of Vehicle	Y
Vehicle Model	Char	15	Vehicle Model	Y
Vehicle Year	Number	4	Make year of vehicle	Y
Vehicle Color	Char	15	Vehicle Color	Y
Originating Agency	Char	30	Originating Agency	Y
Originating Case	Char	30	Originating Case#	Y
Contact	Alpha	562	Contact or Notes	Y

4. Configuration Settings

Configuration settings based on protocol, i.e., SFTP server IP (Internet Protocol) address, login information, and server access settings for the file structure protocol shall be determined to finalize this document.

Table 59: SFTP Server Configuration Settings

Server Name	IP Address	Username	Password	Path
TBD BOS Server Name	TBD	sftpuser	DBA Group has the password	/files/ /images/

Appendix A Definitions

Appendix A includes words, phrases, and acronyms used within this document along with the respective definition.

Table 19: Definitions

Word / Phrase / Acronym	Definition
ACK	Acknowledgement
ACM	Automatic Coin Machine
AVC	Automatic Vehicle Classification
AVI	Automatic Vehicle Identification
BOS	Back Office System
CDT	Central Daylight Time
CMS	Cash Management System
CMSG	Cash Management System Message
CSC	Customer Service Center
EST	Eastern Standard Time
Element	A logical component of an XML document which begins with a start-tag and ends with a matching end-tag. The characters between the start- and end-tags, if any, are the element's content, and may contain markup, including other elements, which are called child elements. An example of an element is: `<AccountID>12345</AccountID>`
EQPT	Equipment Message
ETCC	Electronic Transaction Consultants Corporation
Facility	A toll facility is usually a separately funded construction project. Examples of toll facilities are the Westpark Tollway, Katy Managed Lanes, and Hardy Toll Road.
ORB	Ohio River Bridge
SFTP	Secure File Transfer Protocol
HCTRA	Harris County Toll Road Authority
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICD	Interface Control Document
Lane	A lane is a single lane of traffic at a toll collecting point.
LC	Lane Controller
LNEV	Lane Events
Markup and Content	XML documents consist of markup and content. Markup begins with the character "<" and ends with a ">". Strings of characters which are not markup are content.
MCR	Money Counting Room
MOMS	Maintenance Online Management System
NACK	Negative Acknowledgement

Word / Phrase / Acronym	Definition
OCR	Optical Character Recognition
ORB	Ohio River Bridges
ORT	Open Road Tolling
Plaza	A plaza traditionally includes a physical structure with gates, lanes, toll collectors, coin baskets, unattended lanes, and so on. Open Road Tolling (ORT) roadways have no need for physical plaza structures. Instead, they have tolling zones with minimal structures to mount electronic toll collecting equipment. The term plaza is sometimes used interchangeably with tolling zone, even though there is no physical plaza with ORT.
ROI	Region of Interest
RTCS	A Roadside Toll Collection System refers to all electronic toll collecting equipment at a facility.
BOS File Server	The file server provided by the BOS vendor to support file transfers between the RTCS and the Back Office System
RTM	Requirements Trace Matrix
SFTP	Secure File Transfer Protocol
SOW	Scope of work
Tag	A Tag is a markup construct that is used in XML documents. It begins with "<" and ends with ">".
TOLL	Toll Transactions
TVL	Transponder Validation List
Universal Financial Message (UFM)	The UFM allows transactions to be fully tracked throughout their life cycle which facilitates reporting, audits, reconciliation, ad hoc queries, etc. Also referred to as Uniform Financial Message
UO	Unusual Occurrence
UTC	Coordinated Universal Time
VAS	Video Audit System
VES	Violation Enforcement System
VIL	Vehicle of Interest Light
WSDL	Web Service Description Language
XML	Extensible Markup Language - a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.
XML Document	This ICD defines data structures in XML format for the purpose of passing data from one system to another. The data structures are called "XML Documents."
XSD	XML Schema Definition: A set of rules to which an XML document must conform to be considered 'valid'.

Appendix B Response Codes and Messages

Appendix B includes a table containing the possible response codes and response messages associated with Web Service calls. More response codes and messages shall be added as required.

B.1 Web Service Response Codes and Messages

The table below lists the response codes that are provided to the RTCS upon usage of the BOS TollTransactionService.saveTransactionData Web Service call.

Table 20: Web Service Response Codes and Messages

Response Code	Response Message	24 Hour Response
0	Transaction received successfully	No
101	System is down for maintenance	No
102	General Error (undefined)	Yes
103	Invalid data \"%s1\" in field \"%s2\"	Yes
106	Missing required field, \"%s\"	Yes

B.2 BOS File Acknowledgment Codes and Messages

The table below lists the acknowledgement codes that should be provided by the RTCS to the BOS upon usage of the sendAcknowledgement Web Service call.

Table 21: BOS File Acknowledgment Codes and Messages

Ack Code	Ack Message
0	File Received Successfully
1	No Rate Schedule file is received.
2	No TVL Full File is received
3	No TVL Incremental File is received
11	File cannot be unzipped
12	File cannot be processed
13	File format is not correct
14	File is empty
101	The record is blank

Ack Code	Ack Message
102	The TransponderValidationList is missing
103	The FileGenerateTime is missing
104	The TotalRecordCount is missing
105	The CSCClassification is missing
106	The TransponderID is missing
107	The TransponderAgencyCode is missing
108	The TransponderStatusCode is missing
109	The total record count does not match the Header
201	The record is blank
211	The [FareStructure] section is wrong
212	The [FareStructure] – FareID is wrong
213	The [FareStructure] – Fare is wrong
214	The [FareStructure] – class is wrong
215	The [FareStructure] – payment-type is wrong
216	The [FareStructure] – fare-amount is wrong
217	The [FareStructure] – per-axle-fare is wrong
221	The [Schedule-Fare] section is wrong
222	The [Schedule-Fare] – ScheduleID is wrong
223	The [Schedule-Fare] – Period is wrong
224	The [Schedule-Fare] – start-day is wrong
225	The [Schedule-Fare] – start-time is wrong
226	The [Schedule-Fare] – end-day is wrong
227	The [Schedule-Fare] – end-time is wrong
228	The [Schedule-Fare] – fare-id is wrong
231	The [Plaza-Schedule] section is wrong
232	The [Plaza-Schedule] – Plaza is wrong
233	The [Plaza-Schedule] – facility code is wrong

Ack Code	Ack Message
234	The [Plaza-Schedule] – plaza code is wrong
235	The [Plaza-Schedule] – direction is wrong
236	The [Plaza-Schedule] - effective date/time is wrong
237	The [Plaza-Schedule] – expiry date/time is wrong
238	The [Plaza-Schedule] – schedule-id is wrong
300	TOLL Disp File rejected – Source Transaction not found in TCS. Full file shall be rejected.
301	The record is blank
302	The total count of transactions in the header record doesn't match the number of detail records
400	RTCSTransactionID not found in at RTCS
401	No Images found at RTCS for transaction id of RTCSTransactionID

The table below lists the general acknowledgement code range for acknowledgement codes and messages listed in the BOS File Acknowledgement Codes and Messages table above.

Table 22: BOS File Acknowledgment Codes and Messages Range

Ack Code Range	Ack Message
0	Success
1 - 100	File transfer error
101 – 200	TVL specific errors
201 - 300	Rate Schedule specific errors
300 - 350	BOS RTCS TOLL Disposition File specific errors
400 – 450	Image Re-Review File specific errors
999	Unknown Error – Contact Maintenance Group

Appendix C Field Code Mapping

Appendix C includes sections which outline the mapping of various code tables from the RTCS to the BOS.

C.1 FacilityCodes

The facility codes are defined as follows:

Table 23: Facility Codes

Facility Name	Code
Test Facility	ABCD

C.2 PlazaCodes

The plaza codes are defined as follows:

Table 24: Plaza Codes

Facility Code	Plaza Name	Plaza Code
ABCD	TEST PLAZA EAST	ABCDE
ABCD	TEST PLAZA WEST	ABCDW

C.3 Lane ID

The lane IDs are defined as follows:

Table 25: Lane ID

Code	ID
ABCD-ABCDE-02	02
ABCD-ABCDE-03	03
ABCD-ABCDW-02	02
ABCD-ABCDW-03	03

C.4 Vehicle Classes

The vehicle classes are defined as follows:

Table 26: Vehicle Classes – BOS Supported

ORB Class	Description
0	No vehicle or class detected
1	vehicle with height less than or equal to 7 feet and length less than or equal to 23 feet
2	vehicle with height less than 10 feet
3	vehicle is defined as a non-Class 1 vehicle with height greater than or equal to 10 feet

C.5 Lane Modes

The RTCS lane modes are defined as follows:

Table 27: RTCS Lane Modes

ModeTypeID	ModeType	Abbreviation	TCS Value
1	Closed	Closed	n/a
7	Automatic AVI	AVI	LIVE
9	Maintenance	MAINT	MAINTENANCE
10	Event Mode	EVENT	n/a
11	Standby Mode	Standby	SIMULATED
12	Panic	Panic	n/a
13	Shutdown (Maintenance)	Shutdown	n/a
14	Reboot	Reboot	n/a
15	Startup	Startup	n/a

C.6 Payment Types

The RTCS supports two payment type designations for transactions. Theses payment types are defined as follows:

Table 28: RTCS Payment Types

Transaction Type	Description	RATE File Payment Type ID
ETCL	Electronic payment via transponder	2
VIOL	Video tolling or violation payment via images associated with the transaction	1

C.7 Unusual Occurrence Codes

The RTCS Unusual Occurrence types are defined as follows:

Table 29: RTCS Unusual Occurrence Codes

UOTypeID	Description
4	Lost/stolen Transponder Read
5	Invalid ETCC Patron Account
6	Unrecognized Transponder
7	Unsuccessful ETCC Transaction
10	Transponder Class Mismatch
14	Other
24	Account/Plate Check Requested
25	Over-Weight Vehicle Detected
26	Over-Sized Vehicle Detected
27	Multiple Tags Detected
28	Vehicle Detection Failure (1st gantry)
29	AVC Failure (2nd gantry)
30	Total AVC Detection Failure (1st and 2nd gantry)
31	Front Image Capture Failure (when Vehicle Detection Failure = no or Total AVC Detection Failure = no)
32	Rear Image Capture Failure (when AVC Failure = no or Total AVC Detection Failure = no)
33	Overview Image Capture Failure (when AVC Failure = no or Total AVC Detection Failure = no)
34	License Plate Recognition Failure (when Total AVC Detection Failure = no)

C.8 Agency Codes

The values for transponder issuing agency codes. Theses agency codes examples are defined as follows:

Table 30: Agency Codes

AGCY_ID	IAG_AGCY_CODE	ABBREV	NAME
1007	007	ACE	South Jersey Transportation Authority
1020	020	Advantage I-75	Advantage I-75
1128	128	ALB	Albany Airport
1014	014	Ambassador Bridge, Michigan	Ambassador Bridge, Michigan

AGCY_ID	IAG_AGCY_CODE	ABBREV	NAME
1200	200	ATI	ATI Hub
1027	027	BCBC	Burlington County Bridge Commission
1129	129	Buffalo Airport	Buffalo Airport
1043	043	CTRMA	Central TX Regional Mobility Authority
1019	019	DelDOT	Delaware DOT
1025	025	DRBA	Delaware River and Bay Authority
1029	029	DRJTBC	Delaware River Joint Toll Bridge Commission
1009	009	DRPA	Delaware River Port Authority
1035	035	FTE	Florida Turnpike Enterprise
1002	002	GSP	New Jersey Highway Authority
1011	011	Highway 407, Canada	Highway 407, Canada
1030	030	InDOT	Indiana DOT
15	015	ISTHA	Illinois State Toll Highway Authority
1088	088	KDOT	Kane Country Division of Transportation
1000	000	Manufacturer (Mark IV)	Manufacturer (Mark IV)
1021	021	MassPike	Massachusetts Turnpike Authority
1130	130	McDonald	McDonalds
1016	016	MdTA	Maryland Transportation Authority
1028	028	MeTA	Maine Turnpike Authority
1012	012	MetroDade, Florida	MetroDade, Florida
1008	008	MTAB&T	MTA Bridges & Tunnels
1033	033	NCTA	North Carolina Turnpike Authority
1023	023	New Brunswick (Canada) Highway Corporation	New Brunswick (Canada) Highway Corporation
1022	022	New Jersey CSC	New Jersey CSC
1059	059	NFBC	Niagara Falls Bridge Commission
1026	026	NHDOT	New Hampshire DOT
1003	003	NJTP	New Jersey Turnpike Authority
1047	047	NWP	Northwest Parkway Colorado
1131	131	NYNJArpt	Port Authority of New York & New Jersey Airports
1018	018	NYSBA	New York State Bridge Authority
1004	004	NYSTA	New York State Thruway Authority
1031	031	OTIC	Ohio Turnpike and Infrastructure Commission
1005	005	PANYNJ	Port Authority of New York & New Jersey
1013	013	PBA	Peace Bridge, New York

AGCY_ID	IAG_AGCY_CODE	ABBREV	NAME
1006	006	PTC	Pennsylvania Turnpike Commission
1001	001	Regional CSC	Regional CSC
1032	032	RITBA	Rhode Island Turnpike and Bridge Authority
1045	045	RiverLink	RiverLink
1044	044	SCC	Skyway Concession Company (SCC)
50	050	Skyway	Chicago Skyway
1017	017	South Carolina DOT	South Carolina DOT
1010	010	VDOT	Virginia DOT
1024	024	WVPEDTA	West Virginia Parkways Authority

C.9 Tag Statuses

The values for tag statuses from RTCS are defined below. RTCS will send the value of the Status field based on the TVL mapping of tag statuses at the RTCS.:

Table 31: Tag Statuses

Status	Description	IAG TAG STATUS
2	VALID	1
3	NO BALANCE	3
4	LOW BALANCE	2
7	RETIRED	4
8	NO TAG	-1

C.10 Transaction Statuses

The values for Transaction statuses in BOS are defined below:

Table 32: BOS Transaction Statuses

Status	Description
A	ACTIVE
H	HOLD
I	ICRS REJECT
K	NOT ACTIVE BUT HAS EXCEPTIONED OUT ANOTHER TRANSACTION
O	OPEN
P	PAID
R	RAW
S	SPECIAL EVENTS
U	UNCOLLECTABLE
X	ACTIVE AND HAS EXCEPTIONED OUT ANOTHER TRANSACTION

C.11 BOS Transaction Payment Types

The values for BOS Payment Types are defined below:

Table 33: BOS Transaction Statuses

Payment ID	Description
3	AVI/TAG TRANSACTION
7	VIOLATION TRANSACTION
8	VIOLATION TRANSACTION WITH INVALID/BAD TAG

C.12 BOS Workflow States

The values for BOS Toll Transaction workflow states are defined below. These state IDs are not necessarily in the order of the transaction flow.

Table 34: BOS Toll Workflow States

Workflow State ID	BOS Description	Comments
2	TRANSACTION PARSED	Transaction has been parsed successfully after receiving from RTCS
662	READY FOR HOST TXN PRE AUDIT	Transaction has been enqueued for the pre audit process.
667	LANE PHY. DUP. EXCEPT EXCUSED	Transaction has been excused as a duplicate
6	AUDIT COMPLETED	Transaction has passed the duplicate checks
12	READY FOR CSC	Transaction is ready to post to an account in CSC
14	READY FOR IOP OUTBOUND	Transaction ready to be sent to the IAG peer
18	SENT TO IOP	Transaction has been sent to the BOS IAG peer enqueued for IAG peer
20	POSTED TO IOP	Transaction has been posted to the IAG peer account and disposition updated in BOS
51	SENT TO OOS	Transaction sent for Out of state lookup
61	ICRS REJECT	Transaction has been rejected due to bad image
65	POSTED UNPAID	Posted the transaction to an existing Violator account in an open status.
67	POSTED UNPAID SHELL	Created a shell account and posted transaction to the shell account in an open status.
175	IN COLLECTIONS	Transaction in on an invoice that is in collections
242	FAILED AUDIT TERMINATED	Transaction failed the duplicate check during audit
304	ICRS REJECT TERMINATE	Transaction has been terminated after X number of days
312	PAID UNINVOICED	Transaction has been paid in an un-invoiced state. ex. GPT payment
313	EXCUSED UNINVOICED	Transaction has been excused in an un-invoiced state.
324	POSTED PAID	Transaction has been posted to a customer account in CSC
658	SENT FOR IOP POSTING	Transaction has been sent to the remote IAG peer
659	RECEIVED IOP POSTING RESPONSE	Transaction disposition received from the remote IAG peer

Workflow State ID	BOS Description	Comments
660	IOP TERMINATED	Transaction has been terminated after x days if no response from IAG.
673	READY FOR TOLL INVOICE	Transaction is ready to be invoiced.
680	TOLL INVOICE	Transaction has been placed on a Toll Invoice
683	TOLL INVOICE PAID	Transaction has been paid while on a Toll Invoice
689	TOLL INVOICE EXCUSED	Transaction has been excused while on a Toll Invoice
734	EXCUSED POSTED UNPAID SHELL	Transaction has been excused while on a shell account
749	PICKED UP BY NR ICRS	Transaction has been picked up by TCS image review process
750	RESPONSE FROM NR ICRS	Transaction images have been reviewed and results send back to BOS from TCS
752	RESEND TO NR ICRS	Transaction has been re-sent to TCS for re-review
765	PAID POSTED SHELL	Transaction Paid while on a shell account
768	EXCUSED SENT TO OOS	Transaction has been excused when sent to OOS
770	PAID SENT TO OOS	Transaction has been paid when sent to OOS
779	RTCS LANES DUP TXN EXCUSED	Transaction has been excused due to duplicated match found

C.13 Alert Plate Types

The table below lists the Alert Plate Types.

Table 35: Alert Plate Types

Alert Type	Expiration Period
AMBER ALERT	2 days
STOLEN VEHICLE	7 days
PERSON INTEREST	7 days
SILVER ALERT	2 days
TEST ONLY	90 days
MISSING/ENDANGERED PERSON	7 days
WANTED FELONY VEHICLE	7 days

Alert Type	Expiration Period
MURDER	7 days
CAPITAL MURDER	7 days
MANSLAUGHTER	7 days
KIDNAPPING	7 days
AGGRAVATED KIDNAPPING	7 days
UNLAWFUL TRANSPORT	7 days
TRAFFICKING OF PERSON	7 days
SEXUAL ABUSE OF CHILD	7 days
SEXUAL ASSAULT	7 days
AGGRAVATED SEXUAL ASSAULT	7 days
INJURY TO A CHILD OR ELDERLY	7 days
ABANDONING/ENDANGERING CHILD	7 days
ENTICING A CHILD	7 days
ROBBERY	7 days
AGGRAVATED ROBBERY	7 days
FELONY WANTED PERSON	7 days
NARCOTICS TRAFFICKING	7 days
ORAGANIZED CRIME	7 days
TERRORISM	7 days
TOLL VIOLATOR	90 days
OBSCURED PLATE	7 days
STOLEN PLATE	7 days
MISSING PERSON	7 days
PROHIBITED VEHICLE HARRIS CO.	365 days
INVALID REGISTRATION	365 days
HOME INVASION	7 days
CANCELLED PLATE	365 days
ESCAPE CONVICT	7 days
BLUE ALERT	2 days
TERRORISTRIC THREAT	7 days
PROHIBITED VEHICLE FORT BEND	365 days

Alert Type	Expiration Period
PROHIBITED VEHICLE HARRIS-FB	365 days
UNREGISTERED PLATE	365 days
AGGRAVATED ASSAULT	7 days
SUSPICIOUS VEHICLE	7 days
POLICE IMPERSONATION	90 days

Section 6: Traffic Data

Monthly Traffic by Location thru November 30, 2021

	DTN LINCOLN-I65N				DTO COURT				DTS KENNEDY-I65S				ECS EAST END-I265S				ECN EAST END-I265N				RIVERLINK TOTAL			
	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**
2019																								
Jan	608,039	54,506	115,328	777,873	103,428	5,528	809	109,765	704,089	63,071	125,103	892,263	254,268	14,098	43,031	311,397	248,892	11,886	35,216	295,994	1,918,716	149,089	319,487	**2,387,292**
Feb	582,402	51,041	106,316	739,759	102,575	5,243	717	108,535	679,882	58,961	117,433	856,276	242,562	14,073	39,719	296,354	239,337	11,746	33,093	284,176	1,846,758	141,064	297,278	**2,285,100**
Mar	770,881	64,094	116,798	951,773	130,981	6,224	835	138,040	916,127	72,212	129,289	1,117,628	288,250	16,620	44,996	349,866	269,412	13,365	36,802	319,579	2,375,651	172,515	328,720	**2,876,886**
Apr	794,929	69,639	116,170	980,738	140,659	6,847	890	148,396	879,144	74,086	128,013	1,081,243	298,793	19,875	47,380	366,048	282,697	15,589	38,917	337,203	2,396,222	186,036	331,370	**2,913,628**
May	797,373	69,721	120,894	987,988	149,867	6,883	910	157,660	929,462	77,548	129,987	1,136,997	311,610	21,633	50,265	383,508	294,304	17,888	41,126	353,318	2,482,616	193,673	343,182	**3,019,471**
Jun	771,382	68,664	112,619	952,665	135,367	6,262	775	142,404	916,664	78,669	126,533	1,121,866	298,917	20,682	47,601	367,200	278,325	17,090	38,151	333,566	2,400,655	191,367	325,679	**2,917,701**
Jul	829,136	75,992	113,945	1,019,073	144,798	6,839	887	152,524	966,259	84,958	125,501	1,176,718	320,567	21,734	48,168	390,469	287,576	17,118	36,706	341,400	2,548,336	206,641	325,207	**3,080,184**
Aug	802,348	71,749	120,143	994,240	142,443	6,525	956	149,924	948,552	83,851	134,540	1,166,943	323,003	22,302	54,695	400,000	296,164	17,829	42,792	356,785	2,512,510	202,256	353,126	**3,067,892**
Sep	744,572	66,360	112,962	923,894	131,550	6,309	874	138,733	892,756	77,430	125,436	1,095,622	302,736	22,240	53,663	378,639	282,890	17,742	42,088	342,720	2,354,504	190,081	335,023	**2,879,608**
Oct	735,470	69,008	121,822	926,300	127,269	6,644	1,105	135,018	880,826	82,704	136,178	1,099,708	329,454	22,768	59,024	411,246	303,849	18,338	46,177	368,364	2,376,868	199,462	364,306	**2,940,636**
Nov	656,540	58,166	107,861	822,567	105,096	5,811	939	111,846	724,008	63,978	113,303	901,289	303,125	19,142	50,045	372,312	292,208	16,704	41,581	350,493	2,080,977	163,801	313,729	**2,558,507**
Dec	684,658	55,035	105,538	845,231	103,750	5,717	877	110,344	797,440	58,588	115,812	971,840	302,064	17,287	48,794	368,145	286,040	14,743	38,827	339,610	2,173,952	151,370	309,848	**2,635,170**

	DTN LINCOLN-I65N				DTO COURT				DTS KENNEDY-I65S				ECS EAST END-I265S				ECN EAST END-I265N				RIVERLINK TOTAL			
	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**
2020																								
Jan	629,846	54,967	113,214	798,027	100,725	5,543	831	107,099	715,939	57,738	124,252	897,929	282,965	17,109	55,647	355,721	276,453	14,370	43,349	334,172	2,005,928	149,727	337,293	**2,492,948**
Feb	601,346	52,561	106,615	760,522	97,898	4,774	729	103,401	689,046	60,392	117,546	866,984	272,274	16,491	52,125	340,890	266,874	14,217	40,666	321,757	1,927,438	148,435	317,681	**2,393,554**
Mar	551,352	63,098	115,627	730,077	80,603	4,704	754	86,061	588,076	64,865	126,692	779,633	236,209	18,745	54,582	309,536	224,987	15,782	41,989	282,758	1,681,227	167,194	339,644	**2,188,065**
Apr	319,715	52,178	97,517	469,410	47,659	4,234	681	52,574	348,969	54,095	105,599	508,663	142,748	15,922	42,393	201,063	137,060	13,543	30,822	181,425	996,151	139,972	277,012	**1,413,135**
May	488,184	61,110	104,383	653,677	70,530	4,919	668	76,117	548,637	63,239	109,681	721,557	213,418	19,036	43,809	276,263	193,131	15,258	32,151	240,540	1,513,900	163,562	290,692	**1,968,154**
Jun	588,711	66,818	114,038	769,567	90,419	5,517	760	96,696	682,779	75,120	125,809	883,708	274,293	23,539	54,397	352,229	246,773	18,600	41,416	306,789	1,882,975	189,594	336,420	**2,408,989**
Jul	639,299	70,978	116,646	826,923	93,561	6,249	732	100,542	740,708	80,676	129,634	951,018	296,522	23,787	58,065	378,374	258,320	18,888	43,403	320,611	2,028,410	200,578	348,480	**2,577,468**
Aug	592,795	66,718	118,602	778,115	90,822	5,675	841	97,338	690,433	76,871	133,015	900,319	287,449	25,667	59,045	372,161	255,313	20,578	43,953	319,844	1,916,812	195,509	355,456	**2,467,777**
Sep	564,628	66,115	118,245	748,988	88,184	5,399	834	94,417	685,980	78,834	133,450	898,264	287,597	23,341	60,212	371,150	259,170	18,619	45,282	323,071	1,885,559	192,308	358,023	**2,435,890**
Oct	604,492	70,216	125,472	800,180	89,510	5,748	832	96,090	720,370	83,981	143,023	947,374	290,617	23,403	61,149	375,169	264,293	18,812	46,132	329,237	1,969,282	202,160	376,608	**2,548,050**
Nov	554,545	63,766	118,438	736,749	76,893	5,794	788	83,475	638,767	75,186	132,723	846,676	250,944	19,773	54,614	325,331	233,265	17,345	43,473	294,083	1,754,414	181,864	350,036	**2,286,314**
Dec	566,297	59,825	123,408	749,530	77,520	5,567	792	83,879	677,685	73,588	137,210	888,483	262,909	20,291	58,286	341,486	243,293	17,450	43,378	304,121	1,827,704	176,721	363,074	**2,367,499**

	DTN LINCOLN-I65N				DTO COURT				DTS KENNEDY-I65S				ECS EAST END-I265S				ECN EAST END-I265N				RIVERLINK TOTAL			
	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**	Class 1	Class 2	Class 3	**Total**
2021																								
Jan	527,646	56,423	117,096	701,165	69,954	5,263	812	76,029	594,110	66,219	131,257	791,586	244,023	18,348	58,536	320,907	228,022	13,953	42,665	284,640	1,663,755	160,206	350,366	**2,174,327**
Feb	456,484	52,557	107,626	616,667	63,124	5,051	734	68,909	525,181	61,476	119,252	705,909	207,019	15,912	50,857	273,788	203,705	13,330	39,942	256,977	1,455,513	148,326	318,411	**1,922,250**
Mar	676,197	78,018	132,917	887,132	93,671	6,194	915	100,780	783,561	88,144	147,213	1,018,918	282,960	23,373	62,280	368,613	271,345	18,977	46,969	337,291	2,107,734	214,706	390,294	**2,712,734**
Apr	714,170	80,565	121,951	916,686	89,746	5,933	722	96,401	753,014	84,895	137,120	975,029	295,405	24,964	59,286	379,655	265,952	18,631	43,746	328,329	2,118,287	214,988	362,825	**2,696,100**
May	705,126	75,762	121,971	902,859	95,961	5,875	696	102,532	772,049	81,868	132,932	986,849	297,125	23,641	57,448	378,214	271,822	19,766	45,330	336,918	2,142,083	206,912	358,377	**2,707,372**
Jun	713,057	78,603	123,678	915,338	93,470	5,982	785	100,237	784,515	86,301	132,365	1,003,181	300,312	24,853	58,397	383,562	280,343	21,347	46,895	348,585	2,171,697	217,086	362,120	**2,750,903**
Jul	780,269	79,534	121,766	981,569	97,105	5,767	650	103,522	848,690	85,126	130,707	1,064,523	321,489	24,592	57,586	403,667	293,959	21,119	46,946	362,024	2,341,512	216,138	357,655	**2,915,305**
Aug	784,115	81,880	130,618	996,613	93,761	5,881	782	100,424	776,188	87,349	137,670	1,001,207	322,717	26,030	63,584	412,331	293,031	21,800	51,947	366,778	2,269,812	222,940	384,601	**2,877,353**
Sep	699,839	76,293	119,911	896,043	89,482	5,831	731	96,044	781,389	85,385	134,690	1,001,464	314,903	24,953	54,313	394,169	328,383	27,939	66,481	422,803	2,213,996	220,401	376,126	**2,810,523**
Oct	738,037	77,082	120,612	935,731	88,770	5,799	751	95,320	832,282	90,026	137,051	1,059,359	319,100	24,367	55,643	399,110	347,375	28,699	69,022	445,096	2,325,564	225,973	383,079	**2,934,616**
Nov	853,882	84,467	139,397	1,077,746	87,390	5,614	813	93,817	825,290	87,964	136,892	1,050,146	297,422	21,078	52,813	371,313	335,515	25,824	68,379	429,718	2,399,499	224,947	398,294	**3,022,740**

Monthly Tag Penetration Rates

	2019												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Grand Total**
Grand Total	**2,387,292**	**2,285,100**	**2,876,886**	**2,913,628**	**3,019,471**	**2,917,701**	**3,080,184**	**3,067,892**	**2,879,608**	**2,940,636**	**2,558,507**	**2,635,170**	**33,562,075**
Tag Vehicle Count	1,569,454	1,478,790	1,753,890	1,799,584	1,837,700	1,742,265	1,811,410	1,873,042	1,759,556	1,816,826	1,606,432	1,644,471	20,693,420
No Tag Vehicle Count	817,838	806,310	1,122,996	1,114,044	1,181,771	1,175,436	1,268,774	1,194,850	1,120,052	1,123,810	952,075	990,699	12,868,655
Total Tag %	65.7%	64.7%	61.0%	61.8%	60.9%	59.7%	58.8%	61.1%	61.1%	61.8%	62.8%	62.4%	61.8%
No Tag %	34.3%	35.3%	39.0%	38.2%	39.1%	40.3%	41.2%	38.9%	38.9%	38.2%	37.2%	37.6%	38.2%

	2020												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Grand Total**
Grand Total	**2,492,948**	**2,393,554**	**2,188,065**	**1,413,135**	**1,968,154**	**2,408,989**	**2,577,468**	**2,467,777**	**2,435,890**	**2,548,050**	**2,286,314**	**2,367,499**	**27,547,843**
Tag Vehicle Count	1,633,990	1,547,243	1,403,858	922,711	1,180,308	1,421,369	1,483,922	1,466,540	1,451,423	1,502,248	1,353,199	1,399,884	16,766,695
No Tag Vehicle Count	858,958	846,311	784,207	490,424	787,846	987,620	1,093,546	1,001,237	984,467	1,045,802	933,115	967,615	10,781,148
Total Tag %	65.5%	64.6%	64.2%	65.3%	60.0%	59.0%	57.6%	59.4%	59.6%	59.0%	59.2%	59.1%	61.0%
No Tag %	34.5%	35.4%	35.8%	34.7%	40.0%	41.0%	42.4%	40.6%	40.4%	41.0%	40.8%	40.9%	39.0%

	2021											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Grand Total**
Grand Total	**2,174,327**	**1,922,250**	**2,712,734**	**2,696,100**	**2,707,372**	**2,750,903**	**2,915,305**	**2,877,353**	**2,810,523**	**2,934,616**	**3,022,740**	**29,524,223**
Tag Vehicle Count	1,312,216	1,177,165	1,590,160	1,554,948	1,560,746	1,563,508	1,605,707	1,671,667	1,635,162	1,666,862	1,706,337	**17,044,478**
No Tag Vehicle Count	862,111	745,085	1,122,574	1,141,152	1,146,626	1,187,395	1,309,598	1,205,686	1,175,361	1,267,754	1,316,403	**12,479,745**
% Tag	60.35%	61.24%	58.62%	57.67%	57.65%	56.84%	55.08%	58.10%	58.18%	56.80%	56.45%	57.91%
% No Tag	39.65%	38.76%	41.38%	42.33%	42.35%	43.16%	44.92%	41.90%	41.82%	43.20%	43.55%	42.09%