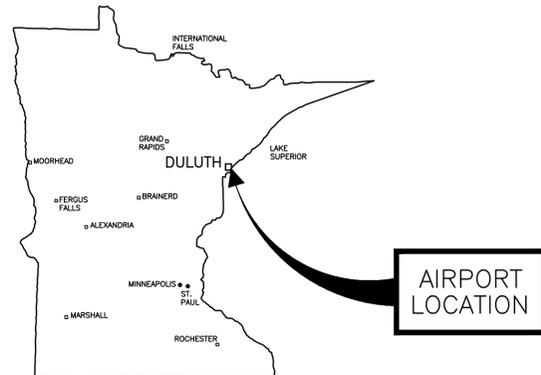


SKY HARBOR AIRPORT

DULUTH, MINNESOTA

DULUTH AIRPORT AUTHORITY in conjunction with MINNESOTA D.O.T.-OFFICE OF AERONAUTICS and the FEDERAL AVIATION ADMINISTRATION

APRON REHABILITATION - PHASE 2



BID DOCUMENTS

MnDOT STATE PROJECT NUMBER: S.P. 6901A-39

AIP PROJECT NUMBER: 3-27-0025-09-14

CONSTRUCTION DRAWINGS PREPARED FOR:



DULUTH AIRPORT AUTHORITY

4701 GRINDEN DRIVE - DULUTH INTERNATIONAL AIRPORT -
DULUTH, MINNESOTA 55811 - TELEPHONE 218/727-2968

DRAWINGS PREPARED BY:

RS&H

Reynolds, Smith and Hills, Inc.

4525 AIRPORT APPROACH ROAD, SUITE A
DULUTH, MINNESOTA 55811
218-722-1203 FAX 218-722-1052
www.rsandh.com

DATE: 06/12/14

INDEX OF DRAWINGS

#	DRAWING TITLE
C001	COVER SHEET
C002	SAFETY AND SECURITY NOTES AND DETAILS
C003	GENERAL NOTES AND ABBREVIATIONS
C004	CONTRACT LAYOUT AND SAFETY PHASING PLAN AND NOTES
C005	HORIZONTAL AND VERTICAL CONTROL PLAN AND NOTES
C100	DEMOLITION PLAN
C200	GEOMETRY PLAN
C201	TYPICAL PAVEMENT SECTIONS AND DETAILS
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C802	VERTICAL PIVOT GATE DETAILS
C803	VERTICAL PIVOT GATE DETAILS
C804	VERTICAL PIVOT GATE DETAILS
C805	WATER SERVICE DETAILS

- WARNING -

BEFORE DIGGING CALL 1-800-252-1166

TO NOTIFY LOCAL UTILITIES

- REQUIRED BY LAW -

Location of work to be done:

Sections 18 & 19, T49N, R13W

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: _____

TYPED/PRINTED NAMES: DARREN K. CHRISTOPHER

DATE: _____ REG. NO.: 45052

RS&H

Submitted By: _____

Date: _____, 2014

RS&H PROJECT NUMBER: 214-1882-119



DULUTH AIRPORT AUTHORITY

Recommended for Approval

By: _____

Title: _____

Date: _____, 2014

SAFETY REQUIREMENTS

- ALL CONTRACTOR VEHICLES SHALL DISPLAY IN FULL VIEW A FLASHING AMBER (YELLOW) DOME-TYPE LIGHT ABOVE THE VEHICLE AND/OR A 3' X 3' OR LARGER, ORANGE AND WHITE CHECKERBOARD FLAG, EACH CHECKERBOARD COLOR BEING 1'-FOOT SQUARE, (SEE CONSTRUCTION SAFETY FLAG DETAIL, THIS SHEET).
- DEBRIS, WASTE AND LOOSE MATERIAL CAPABLE OF CAUSING DAMAGE TO AIRCRAFT LANDING GEARS, PROPELLERS OR BEING INGESTED IN JET ENGINES SHALL NOT BE ALLOWED ON AIRSIDE PAVEMENTS. IF THESE MATERIALS ARE OBSERVED TO BE ON AIRSIDE PAVEMENTS, THEY WILL BE REMOVED IMMEDIATELY AND/OR CONTINUOUSLY BY THE CONTRACTOR DURING CONSTRUCTION AT NO COST TO THE OWNER.
- THE CONTRACTOR IS DIRECTED TO COMPLY WITH AND ACQUAINT HIS/HER EMPLOYEES WITH THE FOLLOWING SAFETY GUIDELINES, RELATED MATERIALS AND FAA ADVISORY CIRCULARS (AC'S):
 - 150/5200-18C "AIRPORT SAFETY--SELF INSPECTION"
 - 150/5210-5D "PAINTING, MARKING & LIGHTING OF VEHICLES USED ON AIRPORTS"
 - 150/5370-2F "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION"

COPIES OF THESE DOCUMENTS ARE PROVIDED IN THE CONTRACT SPECIFICATIONS.

- CONSTRUCTION DURING THE PROJECT MAY BE HALTED AT ANY TIME BY RPR, ENGINEER, AND/OR AIRPORT OPERATIONS IF IT IS DETERMINED TO BE IN THE BEST INTEREST OF AIRPORT OPERATIONS OR SAFETY. THE CONTRACTOR MAY BE DIRECTED TO REMOVE EQUIPMENT AND/OR EVACUATE THE SITE IN ORDER TO ENABLE AIRCRAFT OPERATIONS, NECESSARY EXTENSIONS IN CONTRACT TIME WILL BE GRANTED OR A STOP WORK ORDER WILL BE ISSUED DUE TO THESE DELAYS, HOWEVER, THERE WILL BE NO ADJUSTMENTS IN CONTRACT PRICE DUE TO THESE DELAYS.

IN ADDITION TO THE ABOVE, THE FOLLOWING SPECIAL REQUIREMENTS WILL APPLY FOR NIGHT CONSTRUCTION:

- A DAILY SAFETY AND PROGRESS MEETING SHALL BE HELD BETWEEN THE ENGINEER AND THE CONTRACTOR'S SUPERINTENDENT TO DISCUSS REQUIREMENTS FOR THE NEXT NIGHTTIME WORK PERIOD.
- THE CONTRACTOR SHALL PREPARE A SAFETY PLAN SPECIFIC TO NIGHTTIME CONSTRUCTION OPERATIONS, AS WELL AS A CONTINGENCY PLAN TO ADDRESS CASES OF ABNORMAL FAILURES OR UNEXPECTED DISASTERS USING APPENDIX 3 OF AC 150/5370-2F AS A GUIDE.

- THE CONTRACTOR SHALL INSTALL ALL REQUIRED BARRICADES AT LOCATIONS DESIGNATED BY THE ENGINEER, HAVE ALL EQUIPMENT EITHER FITTED WITH FLASHING YELLOW DOME-TYPE LIGHTS ON TOP OF THE VEHICLES AND/OR FLAGS. ALL THESE ITEMS SHALL CONSIST OF THE SAFETY AND SECURITY SYSTEM. THE CONTRACTOR SHALL INSTALL THE COMPONENTS OF THE SYSTEM AT THE APPROPRIATE TIMES AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL INSPECT EVERY ASPECT OF THE SAFETY AND SECURITY SYSTEM ON AT LEAST A DAILY BASIS AND ENSURE ALL COMPONENTS ARE FUNCTIONING PROPERLY. THE RESIDENT PROJECT REPRESENTATIVE (RPR) SHALL ALSO DAILY INSPECT THE SYSTEM AND IF ANY DEFICIENCIES ARE NOTED, THE CONTRACTOR SHALL HAVE THAT DAY'S PRORATED SAFETY AND SECURITY COST DEDUCTED FROM THE CONTRACTOR'S EARNINGS. THE SYSTEM ELEMENTS TO BE INSPECTED AND DEFICIENCIES NOTED ARE AS FOLLOWS:

- *BARRICADES AND RUNWAY CLOSURE MARKINGS SET PROPERLY PER APPROVED CONTRACTOR SAFETY PLAN AND ALL FLASHING WARNING LIGHTS OPERATING PROPERLY.
- *ALL EQUIPMENT OUTFITTED WITH FLASHING YELLOW DOME-TYPE LIGHTS AND/OR FLAGS.

ANY OF THE ABOVE SAFETY AND SECURITY ITEMS FOUND TO BE DEFICIENT AT THE BEGINNING OF THE DAY BY THE RPR AND/OR AIRPORT OPERATIONS STAFF WILL RESULT IN THAT DAY'S PRORATED SAFETY AND SECURITY BID ITEM LOST AND BEING DEDUCTED PERMANENTLY FROM THE CONTRACTOR'S EARNINGS. THE CONTRACTOR SHALL MAKE A CONCERTED EFFORT TO ENSURE ALL SAFETY AND SECURITY ITEMS ARE IN PROPER WORKING ORDER EACH DAY DUE TO THE HEIGHTENED SECURITY STATUS OF THE AIRPORT AND THE CONSIDERABLE LIABILITY ASSOCIATED WITH THE SAFETY AND SECURITY WORK.

- THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO ENSURE THE SAFETY OF THE TRAVELING PUBLIC AS WELL AS HIS OWN EQUIPMENT AND PERSONNEL. THE CONTRACTOR SHALL OBEY ALL INSTRUCTIONS AS TO ROUTES TO BE TAKEN BY EQUIPMENT TRAVELING WITHIN THE AIRPORT AREA AND KEEP SUCH VEHICLES AND EQUIPMENT MARKED WITH THE SPECIFIED AIRPORT SAFETY FLAGS. THE CONTRACTOR SHALL MAKE HIS OWN ESTIMATE OF ALL DIFFICULTIES TO BE ENCOUNTERED. EQUIPMENT NOT ACTUALLY IN OPERATION SHALL BE KEPT CLEAR OF LANDING AREAS. PERSONNEL SHALL NOT ENTER AREAS OF THE AIRPORT WHERE AIRCRAFT ARE OPERATING WITHOUT SPECIFIC PERMISSION.

- THE CONTRACTOR SHALL TAKE ALL STEPS TO PROTECT THE EXISTING UNDERGROUND CABLES, COMMERCIAL, AND AIRPORT UTILITIES DURING CONSTRUCTION TO ASSURE CONTINUOUS OPERATION OF LIGHTS AND NAVIGATIONAL AIDS WHEN NEEDED.

- MATERIALS STORED OR STOCKPILED ON THE AIRPORT SHALL BE SO PLACED AND THE WORK SHALL, AT ALL TIMES, BE SO CONDUCTED AS TO CAUSE NO GREATER OBSTRUCTION TO THE TRAVELING PUBLIC THAN IS CONSIDERED NECESSARY BY THE ENGINEER.

- THE CONTRACTOR SHALL ERECT AND MAINTAIN ALL NECESSARY BARRICADES, SIGNS, DANGER SIGNALS AND LIGHTS FOR THE PROTECTION OF THE WORK AND THE SAFETY OF THE TRAVELING PUBLIC IN ACCORDANCE WITH THE SPECIFICATIONS (AC 150/5370-2F).

- THE CONTRACTOR SHALL HAVE PERSONNEL ON CALL 24 HOURS PER DAY FOR EMERGENCY MAINTENANCE OF HAZARD LIGHTING AND BARRICADES.

- THE AIRPORT DIRECTOR, WORKING THROUGH THE ENGINEER, SHALL, AT ALL TIMES, HAVE COMPLETE JURISDICTION OVER THE SAFETY OF ALL OPERATIONS DURING THE WORK. WHEREVER THE SAFETY OF THE TRAVELING PUBLIC IS CONCERNED, THE DECISIONS OF THE AIRPORT DIRECTOR OR HIS DESIGNATED REPRESENTATIVE, SHALL BE FINAL AS TO METHODS, PROCEDURES AND MEASURES USED.

- THE CONTRACTOR SHALL CONTACT A PRIVATE UTILITY LOCATOR TO PROVIDE FIELD LOCATIONS OF EXISTING FACILITY CABLES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAND DIGGING TO LOCATE FACILITY CABLING, AND PROTECTION OF THOSE CABLES THROUGHOUT THE PROJECT.

- THE CONTRACTOR SHALL CONFINE HIS PERSONNEL, EQUIPMENT, OPERATIONS AND TRAVEL TO THE AREA WITHIN THE DEFINED WORK LIMITS SHOWN ON THE PLANS.

- THE CONTRACTOR SHALL INFORM ALL CONSTRUCTION PERSONNEL AS TO THE PROPER ROUTES, SPEEDS AND PROCEDURES FOR TRANSPORTING EQUIPMENT AND MATERIALS TO THE CONSTRUCTION SITE. ON A DAILY BASIS AND MORE OFTEN IF NECESSARY ALL PERSONNEL SHALL BE ADVISED OF ANY CHANGES IN AIRPORT OPERATIONS THAT MAY FURTHER RESTRICT HIS MOVEMENT.

- ACCESS OR HAUL ROUTES SHALL BE EXISTING ROADWAYS TO THE EXTENT THAT THEY ARE AVAILABLE. THE CONTRACTOR SHALL CORRECT ANY DAMAGE TO THE ROADS USED AND SHALL RESTORE THOSE ROADS TO THE SAME OR BETTER CONDITION AS THEY EXISTED PRIOR TO THE START OF WORK. THE CONTRACTOR MAY ESTABLISH ADDITIONAL HAUL OR ACCESS ROUTES AT HIS OWN EXPENSE AND RESPONSIBILITY IF APPROVED BY THE OWNER/ENGINEER. UPON COMPLETION OF THE WORK, ANY ADDITIONAL ROADS SHALL EITHER BE LEFT OR GRADED AS DIRECTED SO THAT THEY DO NOT IMPEDE THE EXISTING DRAINAGE OR ACCESS ROUTES. CONTRACTOR IS RESPONSIBLE FOR DOCUMENTING EXISTING DISTRESS WITH PHOTOS, LOCATION, AND/OR VIDEO.

- MEASURES SHALL BE ADOPTED TO PREVENT POTENTIAL POLLUTANTS FROM ENTERING ANY DRAINAGE SYSTEM OR WATERWAY. MATERIALS AND DEBRIS SHALL NOT BE STORED IN THE WORK AREA IN A MANNER THAT WOULD ALLOW THEM TO ENTER THE DRAINAGE SYSTEM AS A RESULT OF SPILLAGE, NATURAL RUNOFF OR FLOODING. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IMMEDIATELY NOTIFY THE AIRPORT SHOULD THERE BE A SPILLAGE OF MATERIAL WHICH MIGHT CONTAMINATE THE DRAINAGE SYSTEM. IT SHALL ALSO BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND CLEAR UP SUCH SPILLAGE IN A MANNER ACCEPTABLE TO THE AIRPORT. MATERIAL SHALL BE SECURED SO THAT IT WILL NOT BE BLOWN BY THE WIND ONTO THE AIRFIELD SURFACES.

- SPECIAL ATTENTION TO DUST CONTROL WILL BE REQUIRED WHEN EARTHWORK OR HAULING OPERATIONS ARE IN PROGRESS OR WHEN WIND AND WEATHER CONDITIONS CAUSE EXCESSIVE BLOWING OF DUST. IN THIS REGARD, THE CONTRACTOR SHALL APPLY WATER OR CALCIUM CHLORIDE SOLUTION TO THE AFFECTED SITES AS DIRECTED BY THE AIRPORT OR THE ENGINEER.

- VEHICLES WITHIN THE SECURITY FENCE SHALL BE VISIBLY IDENTIFIABLE AS CONTRACTOR VEHICLES WHICH HAVE BEEN PROPERLY CLEARED FOR ENTRY (LOGO AND FLAGS ON AUTHORIZED EQUIPMENT AND VEHICLES WOULD BE ACCEPTABLE.)

- CONSTRUCTION EQUIPMENT SHALL HAVE A MAXIMUM HEIGHT OF TWENTY-FIVE (25) FEET.

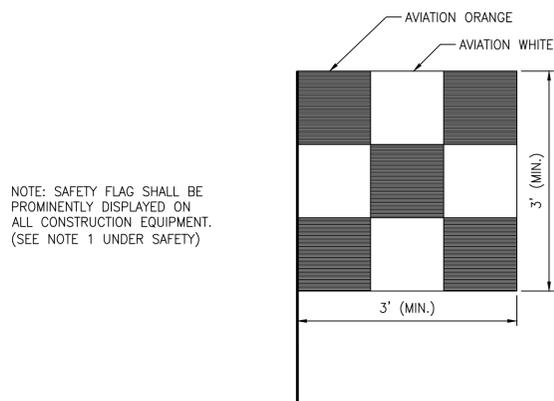
- THE CONTRACTOR SHALL SUBMIT A SAFETY AND SECURITY PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL BY THE AIRPORT 15 DAYS PRIOR TO CONSTRUCTION COMMENCING.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING UTILITY LINES AND HAND DIGGING TO LOCATE CABLING AND SHALL PROVIDE ADEQUATE PROVISIONS TO PROTECT ALL CABLES EXPOSED DURING THE PROPOSED WORK. THE SPONSOR/CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE AIRPORT AT THE PROJECT PRE-CONSTRUCTION MEETING SHOULD CABLE RELOCATION BE NECESSARY.

- ANY DAMAGE TO CABLES, ACCESS ROADS, OR TO FACILITIES DURING THE CONSTRUCTION WILL REQUIRE THE CONTRACTOR TO REPLACE THE DAMAGED CABLES, ACCESS ROAD, FACILITIES TO THE ENGINEER'S REQUIREMENTS, AND AT THE CONTRACTORS' EXPENSE.

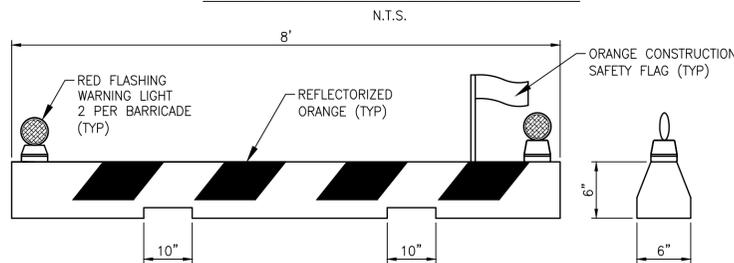
- IF ANY POWER, CONTROL, OR SIGNAL CABLES ARE DAMAGED, THE SPONSOR/CONTRACTOR SHALL REPLACE THE CABLE IN ITS ENTIRETY. THE SPLICING OF CABLES IS NOT AN ACCEPTABLE REPAIR.

- ALL NON-RADIO EQUIPPED CONTRACTOR VEHICLES THAT ARE REQUIRED TO OPERATE ON OR ACROSS THE ACTIVE RUNWAYS, TAXIWAYS, APRONS, OR RUNWAY APPROACH AND PROTECTION ZONES SHALL DO SO UNDER THE DIRECT CONTROL OF A RADIO EQUIPPED ESCORT VEHICLE. ESCORT VEHICLES, OPERATORS, AND RADIO EQUIPMENT SHALL BE APPROVED BY THE DULUTH AIRPORT AUTHORITY. ESCORT VEHICLES SHALL BE MARKED AND LIGHTED AS DESCRIBED IN PARAGRAPH 1 ABOVE AND SHALL BE EQUIPPED WITH AN APPROVED AVIATION BAND. RADIO EQUIPPED VEHICLES SHALL CONTINUOUSLY MONITOR UNICOM FREQUENCY (122.7 MHZ). ALL AIRCRAFT TRAFFIC SHALL HAVE PRIORITY OVER CONTRACTOR'S TRAFFIC.



NOTE: SAFETY FLAG SHALL BE PROMINENTLY DISPLAYED ON ALL CONSTRUCTION EQUIPMENT. (SEE NOTE 1 UNDER SAFETY)

CONSTRUCTION SAFETY FLAG



LOW PROFILE BARRICADE
(MUST MEET FAA ADVISORY CIRCULAR 150/5370-2F REQUIREMENTS)

NTS

BARRICADE PLACEMENT NOTES

- BARRICADES SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLAN THROUGH COORDINATION WITH AIRPORT AND ENGINEER STAFF. THE PHASE DURING WHICH EACH BARRICADE IS TO REMAIN IN PLACE IS INDICATED BY THE BARRICADE LABELS. BARRICADES SHALL BE INSTALLED AT THE BEGINNING OF EACH PHASE AND SHALL REMAIN IN PLACE THROUGHOUT THE PHASE. THE CONTRACTOR SHALL NOT MOVE ANY BARRICADE WITHOUT PRIOR COORDINATION WITH AIRPORT AND ENGINEER. AT NO TIME DURING CONSTRUCTION SHALL THE CONTRACTOR GO BEYOND THE BARRICADES OR PHASING LIMITS OF CONSTRUCTION.
- BARRICADES SHALL CONFORM TO THE LOW PROFILE CONSTRUCTION BARRICADE DETAIL HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND UPKEEP OF THE BARRICADES THROUGHOUT THE PROJECT. THE AIRPORT/OWNER SHALL SUPPLY BARRICADES FOR USE ON THE PROJECT. FOLLOWING COMPLETION OF THE WORK THE BARRICADES SHALL BE REMOVED FROM THE PROJECT. THE BARRICADES SHALL BE CONTINUOUSLY LINKED WITH FLASHING RED LIGHTS AND FLAGS, AND SHALL BE WEIGHTED TO PREVENT MOVEMENT FROM HIGH WINDS AND JET OR PROP BLAST. ALL COSTS ARE INCIDENTAL TO THE PROJECT. BARRICADE RED LIGHTS SHALL MEET MDDOT LUMINANCE REQUIREMENTS.
- BARRICADES ARE TO BE ADEQUATELY SECURED AGAINST MOVEMENT DUE TO WIND AND AIRCRAFT ENGINE THRUST. BARRICADES MAY BE PINNED IF LOCATED ON PAVEMENT PLANNED FOR DEMOLITION IN LATTER PHASES.
- ALL BARRICADES SHALL BE CHECKED VISUALLY ON A DAILY BASIS AND SHALL BE MAINTAINED AS NEEDED OR AS DIRECTED BY THE ENGINEER.
- THE COST OF BARRICADES, BARRICADE PLACEMENT, MAINTENANCE AND OTHER TRAFFIC CONTROL EXPENSES SHALL BE INCIDENTAL TO THE TEMPORARY CONSTRUCTION ITEMS BID ITEM.

SECURITY REQUIREMENTS

- GENERAL INTENT:** IT IS INTENDED THAT THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE AIRPORT SECURITY PLAN AND WITH THE SECURITY REQUIREMENTS SPECIFIED HEREIN BY AIRPORT OPERATIONS. THE CONTRACTOR SHALL DESIGNATE TO THE ENGINEER AND AIRPORT OPERATIONS, IN WRITING, THE NAME OF HIS "CONTRACTOR SECURITY AND SAFETY OFFICER (CSSO)." THE CSSO SHALL REPRESENT THE CONTRACTOR ON THE SECURITY REQUIREMENTS FOR THE CONTRACT.

- CONTRACTOR PERSONNEL SECURITY ORIENTATION:** THE CSSO SHALL BE RESPONSIBLE FOR BRIEFING ALL CONTRACTOR PERSONNEL ON SECURITY REQUIREMENTS. ALL NEW CONTRACTOR EMPLOYEES SHALL BE BRIEFED ON SECURITY REQUIREMENTS PRIOR TO WORKING IN THE CONSTRUCTION AREA. THE AIRPORT SHALL BRIEF AND/OR TRAIN CONSTRUCTION RELATED VEHICLE EQUIPMENT DRIVERS ON OPERATIONS WITHIN AN AIRPORT/AIRCRAFT ENVIRONMENT. AIRPORT MANAGEMENT SHOULD PROVIDE PRINTED MATERIAL TO EACH VEHICLE OPERATOR THAT DEPICTS HAUL ROUTES, PROHIBITED MOVEMENT AREAS, AND DESCRIBES THE CONSEQUENCES FOR NON-COMPLIANCE WITH ESTABLISHED PROCEDURES. THE AIRPORT HAS IMPLEMENTED A ZERO TOLERANCE APPROACH TO DRIVING VIOLATIONS.

- ACCESS TO THE SITE:** CONTRACTOR'S ACCESS TO THE SITE SHALL BE AS SHOWN ON THE PLANS. NO OTHER ACCESS POINTS SHALL BE ALLOWED UNLESS APPROVED BY AIRPORT OPERATIONS IN ADVANCE. ALL CONTRACTOR TRAFFIC AUTHORIZED TO ENTER THE SITE SHALL BE EXPERIENCED IN THE ROUTE OR GUIDED BY CONTRACTOR PERSONNEL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL TO AND FROM THE VARIOUS CONSTRUCTION AREAS ON THE SITE. A CONTRACTOR'S FLAGMAN OR TRAFFIC CONTROL PERSON SHALL MONITOR AND COORDINATE ALL CONTRACTOR TRAFFIC WITH SECURITY. THE CONTRACTOR SHALL NOT PERMIT ANY UNAUTHORIZED CONSTRUCTION PERSONNEL OR TRAFFIC ON THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR THE IMMEDIATE CLEANUP OF ANY DEBRIS DEPOSITED ALONG THE ACCESS ROUTE AS A RESULT OF ITS CONSTRUCTION TRAFFIC.

- CONSTRUCTION AREA LIMITS:** THE LIMITS OF CONSTRUCTION, MATERIAL STORAGE AREAS, PLANT SITE, EQUIPMENT STORAGE AREA, PARKING AREA AND OTHER AREAS DEFINED AS REQUIRED FOR THE CONTRACTOR'S EXCLUSIVE USE DURING CONSTRUCTION SHALL BE MARKED BY THE CONTRACTOR. THE CONTRACTOR SHALL ERECT AND MAINTAIN AROUND THE PERIMETER OF THESE AREAS SUITABLE FENCING, MARKING AND/OR WARNING DEVICES VISIBLE FOR DAY/NIGHT USE. TEMPORARY BARRICADES, FLAGGING AND FLASHING WARNING LIGHTS WILL BE REQUIRED AT CRITICAL ACCESS POINTS. TYPE OF MARKING AND WARNING DEVICES SHALL BE APPROVED BY AIRPORT OPERATIONS.

- IDENTIFICATION--PERSONNEL:** ALL EMPLOYEES, AGENTS, VENDORS, INVITEES, ETC. OF THE CONTRACTOR OR SUBCONTRACTORS REQUIRING ACCESS TO THE AIRCRAFT OPERATIONS AREA (AOA) SHALL BE INSTRUCTED BY THE AIRPORT AS TO THE PROPER PROCEDURE TO ACCESS THE AOA. IDENTIFIABLE HARD HATS OR OTHER IDENTIFICATION SHALL ALSO BE WORN AT ALL TIMES IF REQUIRED BY AIRPORT OPERATIONS. THE CONTRACTOR AND ITS STAFF IS RESPONSIBLE FOR ATTENDING TRAINING WHICH WILL INCLUDE AIR/GROUND RADIO, TAXIWAY AND AIRPORT FAMILIARIZATION. ESTIMATED TIME FOR COMPLETION IS 1 HOUR.

- IDENTIFICATION--VEHICLES:** THE CONTRACTOR, THROUGH THE CSSO, SHALL ESTABLISH AND MAINTAIN A LIST OF CONTRACTOR AND SUBCONTRACTOR VEHICLES AUTHORIZED TO OPERATE ON THE SITE. CONTRACTOR EMPLOYEE VEHICLES SHALL BE RESTRICTED TO THE CONTRACTOR'S EMPLOYEE PARKING AREA AND ARE NOT ALLOWED ON THE AOA AT ANY TIME.

- FINES:** IN THE EVENT THE CONTRACTOR DEVIATES FROM THE IDENTIFIED CONSTRUCTION LIMITS AND/OR DESIGNATED HAUL ROUTES ONTO AN ACTIVE RUNWAY OR TAXIWAY THE CONTRACTOR WILL BE FINED \$1,000 PER OCCURRENCE WHICH WILL BE DEDUCTED FROM THE FINAL CONTRACT AMOUNT DUE THE CONTRACTOR.

- A MINIMUM OF 48 HOURS IN ADVANCE OF ANY EXCAVATION OR BORINGS, THE CONTRACTOR SHALL CONTACT THE FOLLOWING LOCAL CABLE OWNERS AS WELL AS A PRIVATE LOCATOR TO VERIFY ALL UNDERGROUND CABLE LOCATIONS IN THE VICINITY OF THE PROPOSED WORK:

CABLE OWNER	CONTACT PERSON	PHONE NUMBER
DULUTH AIRPORT AUTHORITY	BRIAN MADSEN	218-733-8073
OTHERS	GOPHER STATE ONE-CALL	800-252-1166

- RESPONSIBILITY FOR TEMPORARY LIGHTING AND MARKING**

THE CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND MAINTAINING THE NECESSARY BARRICADES AND HAZARD LIGHTING AS REQUIRED BY THE SPECIFICATIONS TO MARK CONSTRUCTION AREAS, HAZARDS, ETC. REFLECTORIZED LOW PROFILE BARRICADES WITH ATTACHED FLASHING RED LIGHTS FOR NIGHT USE ARE THE PREFERRED TYPE OF BARRICADE FOR USE ON THE AIRPORT.



Reynolds, Smith and Hills, Inc.

4525 Airport Approach Road, Suite A
Duluth, Minnesota 55811
218-722-1227 FAX 218-722-1052
www.rsandh.com



DULUTH AIRPORT
AUTHORITY

**SKY HARBOR AIRPORT
APRON
REHABILITATION -
PHASE 2**

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 06-12-14

REVIEWED BY: DKC

DRAWN BY: AEE

DESIGNED BY: AEE

AEP PROJECT NUMBER
214-1882-119

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SHEET TITLE
**SAFETY AND
SECURITY
NOTES AND
DETAILS**

SHEET NUMBER

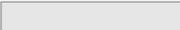
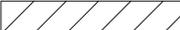
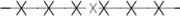
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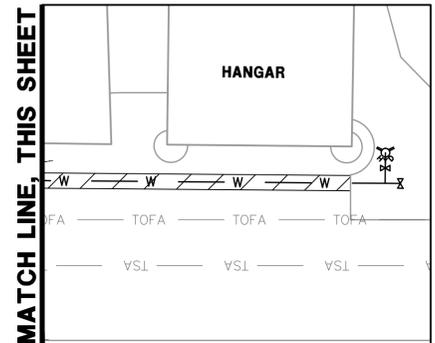
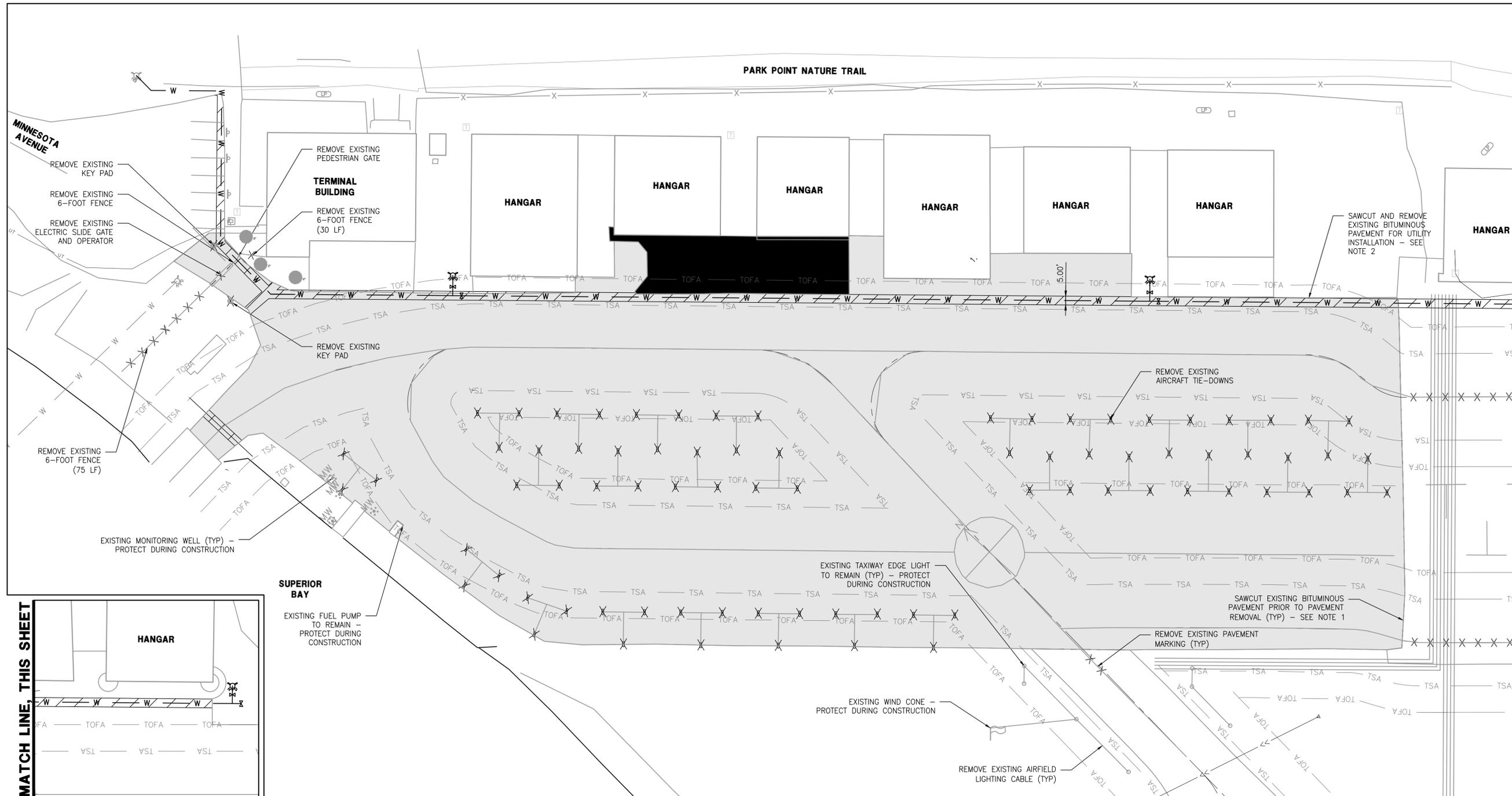
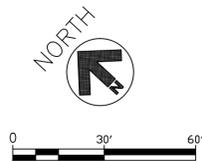
**BID
DOCUMENTS**

DEMOLITION NOTES

1. CONTRACTOR SHALL REPAIR ANY AND ALL EXISTING PAVEMENT TO REMAIN THAT IS DAMAGED DURING CONSTRUCTION ACTIVITIES. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED FOR REPAIRING EXISTING PAVEMENT TO REMAIN.
2. TRENCHING FOR UTILITY INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE UTILITY INSTALLATION. FOLLOWING COMPLETION OF ACCEPTED UTILITY INSTALLATION, EACH PAVEMENT LAYER SHALL BE RECONSTRUCTED TO MATCH THE MATERIAL AND THICKNESS OF THE ADJACENT EXISTING PAVEMENT.
3. SEE SHEET C200 FOR COORDINATES OF PAVEMENT REMOVAL AND RECONSTRUCTION.

LEGEND

-  REMOVE EXISTING CONCRETE PAVEMENT OVERLAID WITH BITUMINOUS PAVEMENT
-  REMOVE EXISTING BITUMINOUS PAVEMENT
-  REMOVE EXISTING BITUMINOUS PAVEMENT AND TRENCH FOR UTILITY INSTALLATION
-  SAWCUT EXISTING BITUMINOUS PAVEMENT FULL DEPTH
-  REMOVE EXISTING 6-FOOT FENCE AND PEDESTRIAN GATE
-  REMOVE EXISTING ELECTRIC SLIDE GATE AND OPERATORS
-  REMOVE EXISTING DIRECT BURIED AIRFIELD LIGHTING CABLE
-  REMOVE EXISTING PAVEMENT MARKINGS
-  REMOVE EXISTING KEY PAD
-  REMOVE EXISTING AIRCRAFT TIE-DOWNS



MATCH LINE, THIS SHEET



Reynolds, Smith and Hills, Inc.
 4525 Airport Approach Road, Suite A
 Duluth, Minnesota 55811
 218-722-1227 FAX 218-722-1052
 www.rsandh.com



**SKY HARBOR AIRPORT
 APRON
 REHABILITATION -
 PHASE 2**

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

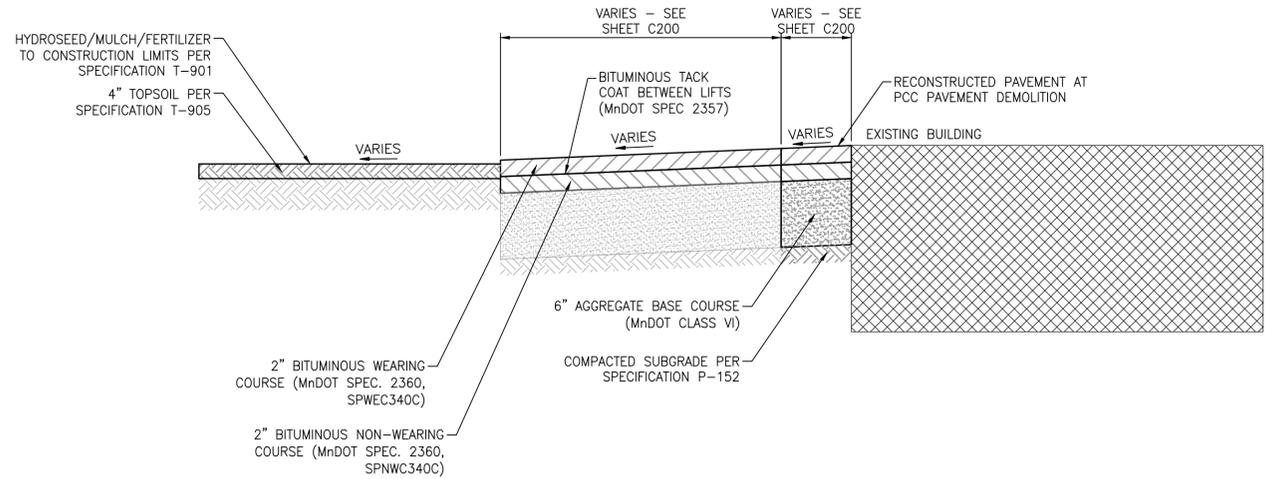
DATE ISSUED: 06-12-14
 REVIEWED BY: DKC
 DRAWN BY: AEE
 DESIGNED BY: AEE

AEP PROJECT NUMBER
214-1882-119
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 SHEET TITLE

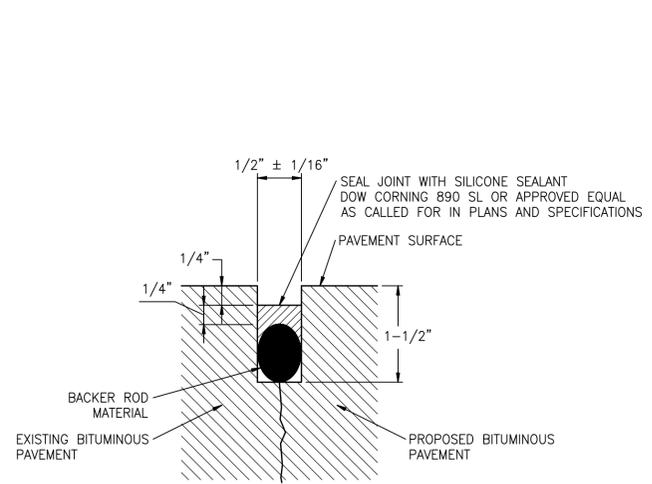
**DEMOLITION
 PLAN**

SHEET NUMBER
C100

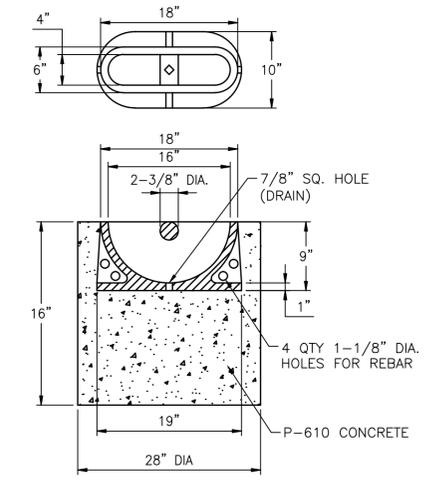
**BID
 DOCUMENTS**



1 TYPICAL APRON PAVEMENT SECTION - REHABILITATION AND NEW
 SCALE: N.T.S.



2 BITUMINOUS JOINT DETAIL
 SCALE: N.T.S.



3 AIRCRAFT TIE-DOWN DETAIL
 SCALE: N.T.S.

1. PAVEMENT CROSS SLOPE VARIES SEE GRADING PLANS.
2. ALL DISTURBED AREAS OUTSIDE OF PAVEMENT SHALL HAVE A MINIMUM OF 4" OF TOPSOIL, UNLESS NOTED, AND SHALL INCLUDE HYDROSEED/MULCH.
3. ALL BITUMINOUS PAVEMENT MILLINGS AND CONCRETE PAVEMENT DEBRIS SHALL BE TRANSPORTED AND DUMPED TO AN OFFSITE LOCATION.
4. ALL EXCESS MATERIALS SHALL BE DISPOSED OFFSITE BY THE CONTRACTOR. ALL TEMPORARY STOCKPILES SHALL COMPLY WITH FAR PART 77 SURFACES AND SHALL HAVE NO MORE THAN 4:1 SIDE SLOPES TO ALLOW FOR MAINTENANCE. ALL TEMPORARY STOCKPILES SHALL BE HYDROSEED/MULCHED AND HAVE PROPER EROSION CONTROL AND SEDIMENTATION MEASURES INSTALLED. ALL COSTS SHALL BE INCIDENTAL TO UNCLASSIFIED EXCAVATION.

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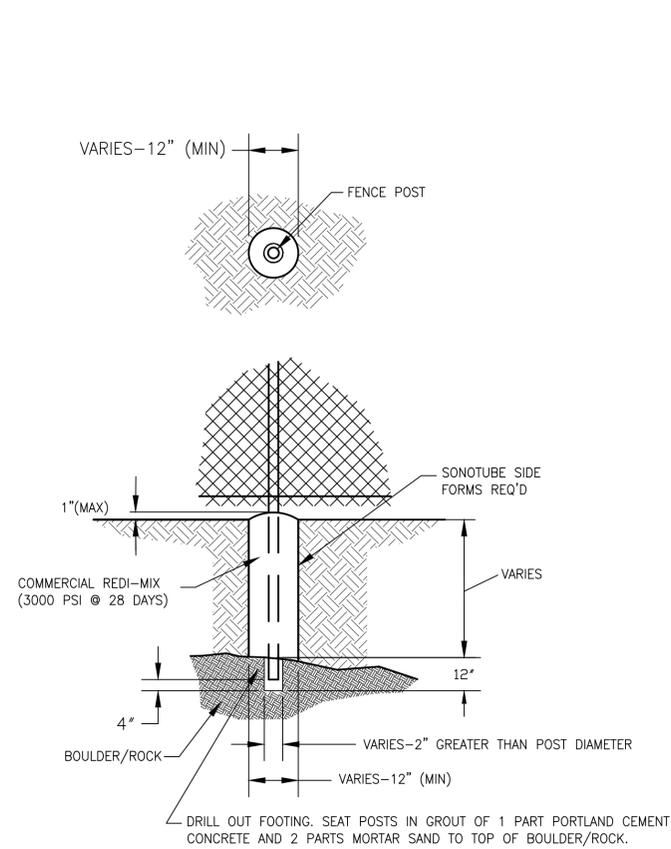
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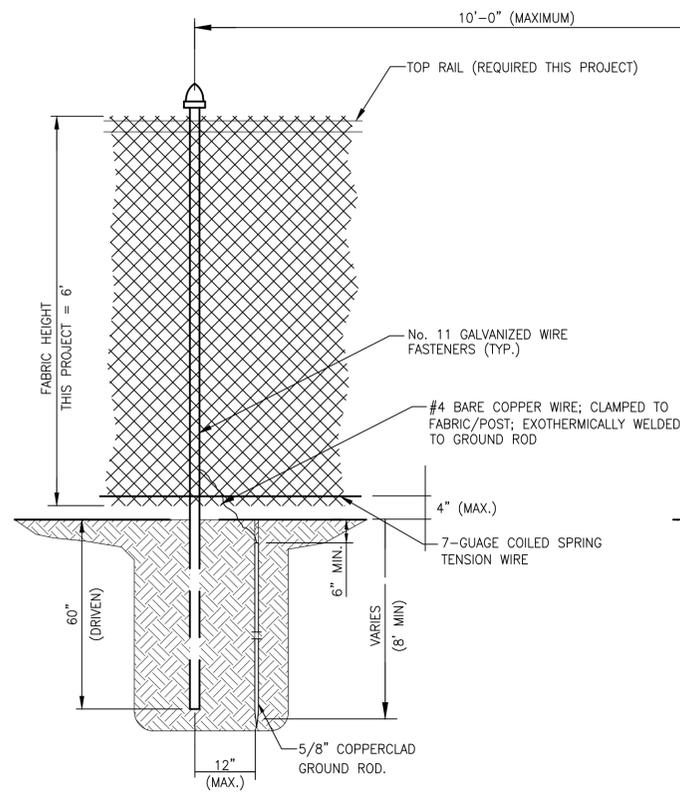
SHEET TITLE
**TYPICAL
 PAVEMENT
 SECTIONS AND
 DETAILS**

SHEET NUMBER
C201

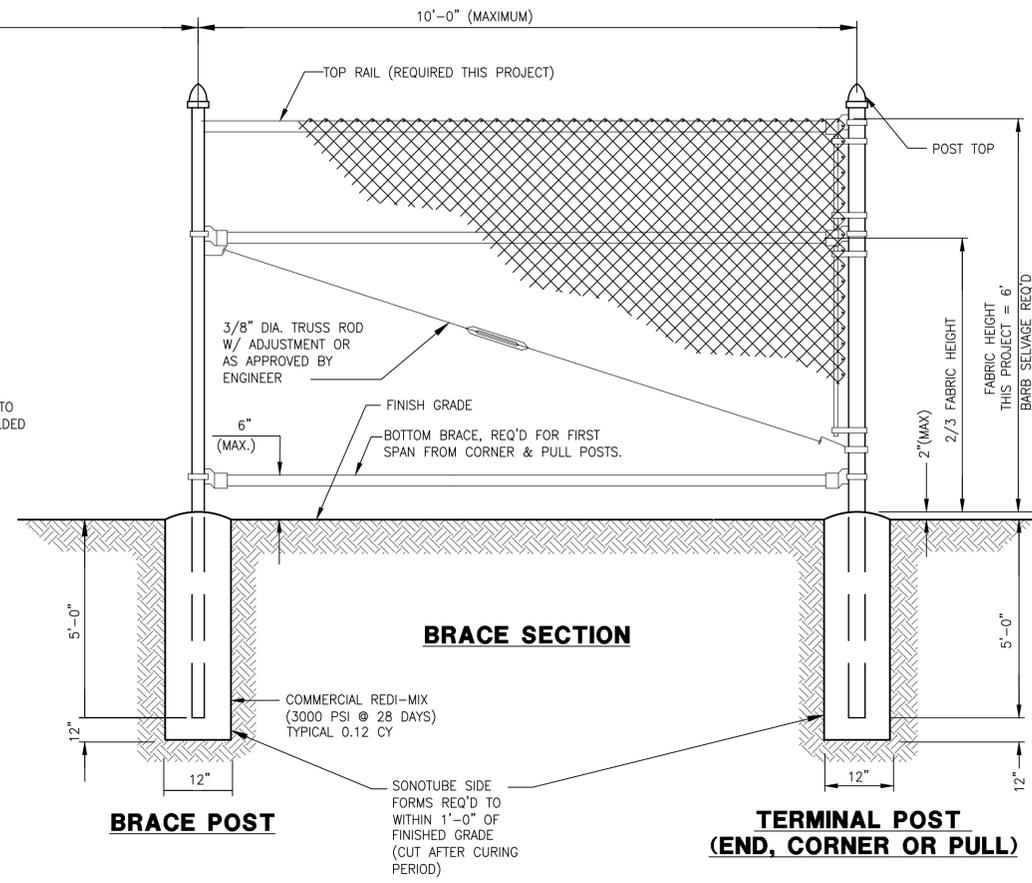
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1 **BOULDER/ROCK FOOTING DETAIL**
 C801 SCALE: NTS



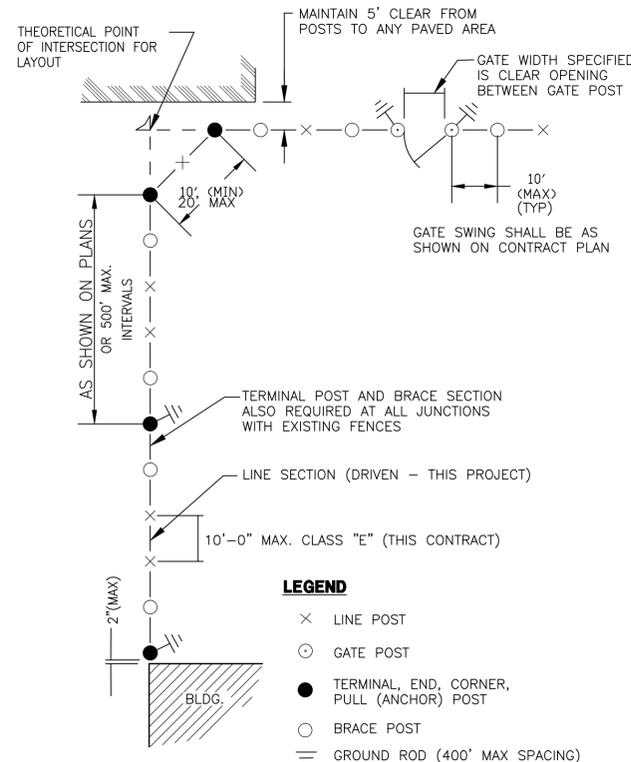
2 **TURF LINE POST (INTERMEDIATE)**
 C801 SCALE: NTS



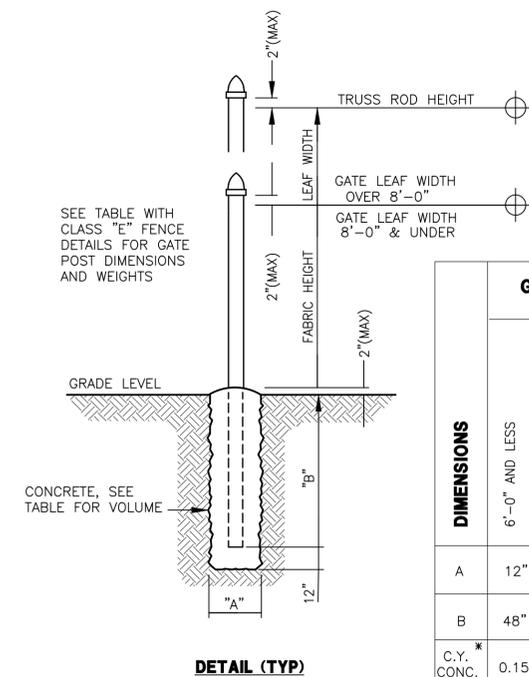
3 **CHAIN-LINK FENCE, CLASS E, FAA SPEC. F-162**
 C801 SCALE: NTS

TYPICAL CHAIN LINK FENCE MEMBERS, DIMENSIONS & WEIGHTS			
DESCRIPTION	SECTION	STEEL FRAME	
		OUTSIDE DIMENSION (INCHES)	WEIGHT (LBS/FT.)
CORNER, BRACE, END AND PULL POSTS FABRIC HEIGHTS 6 FT AND LESS	○	2.375	3.65
	□	2.00	3.60
	○	2.875	5.79
FABRIC HEIGHTS OVER 6 FT	○	2.5	5.70
	□	3.5x3.5	5.10
GATE POSTS	○	3 OR 4	5.79
	□	2.5	5.70
	□	3.5x3.5	5.10
GATE LEAF WIDTH 6 FT AND LESS	○	4.0	9.11
	○	6.625	18.97
	○	8.625	24.70
	○	1.90	2.72
FABRIC HEIGHTS OVER 6 FT	○	2.375	3.65
	○	1.660	1.806
RAILS & BRACES	○	1.625x1.250	1.35

- NOTES:**
- GALVANIZED STEEL PIPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F 1083.
 - POLYMER-COATED STEEL PIPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 569. POLYMER COATING SHALL BE IN ACCORDANCE WITH ASTM F 1234, TYPE B. POLYMER COATING SHALL BE IN ACCORDANCE WITH ASTM F 1234, TYPE B.
 - THE STEEL USED IN ALL STRUCTURAL SHAPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 572, GRADE 45, AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM F 1234, TYPE A.
 - ROLL-FORMED SECTIONS SHALL BE FABRICATED FROM MATERIAL MEETING THE REQUIREMENTS OF ASTM A 570, GRADE 45, AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 123, OR COATED WITH ZINC-5% ALUMINUM MISCHMETAL ALLOY IN ACCORDANCE WITH ASTM F 1234, TYPE C.



4 **TYPICAL FENCE LAYOUT**
 C801 SCALE: NTS



5 **GATE POST & CONCRETE BASE**
 C801 SCALE: NTS

DIMENSIONS	GATE WIDTH (ONE LEAF)			
	6'-0" AND LESS	OVER 6'-0" TO 10'-0"	OVER 10'-0" TO 15'-0"	OVER 15'-0" TO 18'-0"
A	12"	16"	20"	24"
B	48"	66"	66"	66"
C.Y. CONC.	0.15	0.42	0.53	0.76

* COST OF FURNISHING & PLACING CONCRETE INCIDENTAL TO COST OF EACH GATE

SCHEDULE

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SHEET TITLE

**FENCE
 DETAILS**

SHEET NUMBER

C801

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GATE NOTES:

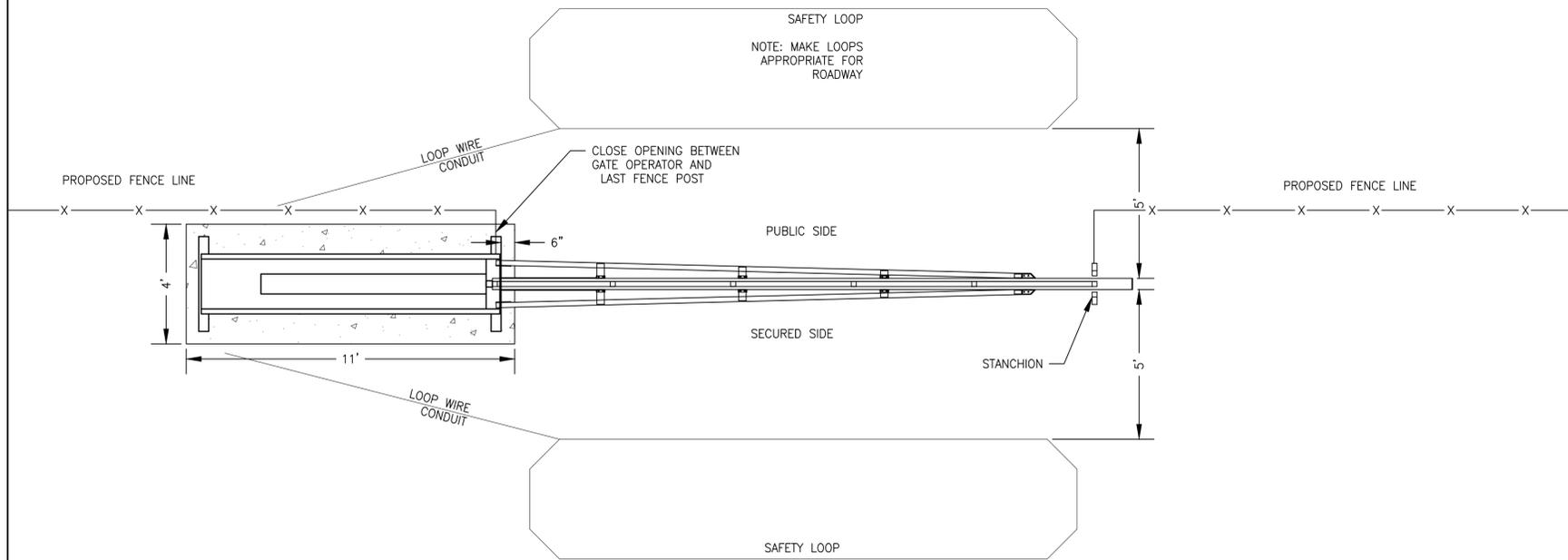
- GATES SHALL HAVE A DEVICE WITH PROVISIONS FOR LOCKING. (SEE DETAIL #6 THIS SHEET)
- WELDS ON STEEL FRAMES SHALL BE GROUND SMOOTH, THOROUGHLY CLEANED AND COVERED WITH ALUMINUM OR ZINC BASE PAINT.
- GATES AND FITTINGS SHALL BE GALVANIZED STEEL PIPE PER REQUIREMENTS FOR POSTS, RAILS & BRACES
- INSTALLATION SHALL MEET FAA SPEC. F-162, LATEST EDITION.
- AS BARBED WIRE EXTENSION ARMS ARE SPECIFIED FOR FENCE, THE GATE POSTS SHALL BE EXTENDED 12" MINIMUM ABOVE THE TOP OF THE FENCE FABRIC, FOR TERMINATING THE BARBED WIRE.
- GATE SHALL BE 18' X 6' AMPLIMESH.
- GATE SHALL BE INSTALLED WITH 150 MPH BRACING.
- GATE SHALL OPERATE AT TEMPERATURES TO -40 F.
- ALTERNATE POWER SOURCE WHEN COMMERCIAL POWER IS UNAVAILABLE.
- ELECTRIC HEAT TAPE SHALL BE INSTALLED IN CONCRETE BASE (INCIDENTAL TO GATE)

F-162 FENCE NOTES:

- FABRIC: 2"x2" No. 9 GAUGE GALVANIZED STEEL WIRE MESH.
- SELVAGE RAILS & TENSION WIRES: FENCES SHALL HAVE BARBED SELVAGE AND 7 GAUGE COILED SPRING TENSION WIRES PROVIDED, BOTTOM; KNUCKLED BARBED SELVAGE AND TOP RAIL, TOP.
- POSTS: SEE SHEET C101.
- FABRIC FASTENERS: MINIMUM 3/16" x 3/4" STRETCHER BAR, Banded to terminal posts; OR INTEGRAL FABRIC FITTINGS ON terminal posts. USE NO. 6 WIRE CLIPS FOR LINE POSTS AND NO. 9 WIRE CLIPS FOR BRACES, RAILS, AND TENSION WIRES. ALL FASTENERS SPACED 14" MAX. VERTICALLY, 24" MAX. HORIZONTALLY. ALL FABRIC FASTENERS SHALL BE SAME MATERIAL AS FENCE FABRIC BASE MATERIAL.
- COATINGS: ZINC COATING ON POSTS, RAILS, GATE FRAMES AND STEEL FITTINGS SHALL AVERAGE 2.0 OZ./S.F. NO INDIVIDUAL SPECIMEN SHALL HAVE LESS THAN 1.8 OZ./S.F.
- FENCE HEIGHT: THE FABRIC HEIGHT SHALL BE TEN (10') FEET.
- BARBED WIRE: 3-STRANDS OF BARBED WIRE SHALL BE PLACED THIS CONTRACT.
- POSTS IN PAVEMENT: POSTS SET IN EXISTING PAVEMENTS SHALL HAVE PAVEMENT CORED FULL DEPTH TO A DIAMETER THAT WILL PROVIDE 2" CLEAR TO POST ON ALL SIDES.
- TIES: WIRE TIES SHALL BE OF THE SAME MATERIAL & COATING WEIGHT AS THE FABRIC TYPE WILL ALLOW ALUMINUM WIRE FASTENER TIES.

NOTE:

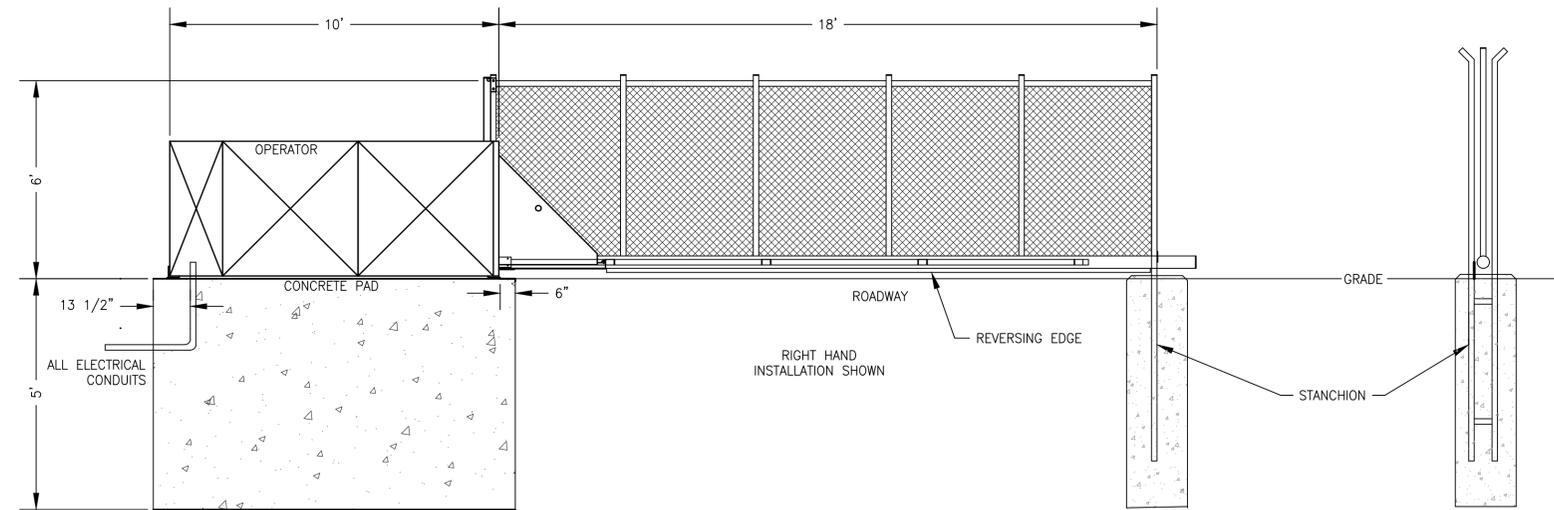
- SITE RESTORATION ASSOCIATED WITH GATE INSTALLATION SHALL BE INCIDENTAL TO THE GATE AND SHALL NOT BE PAID FOR SEPARATELY.
- CONTRACTOR SHALL VERIFY CABLES FOR GATE POWER, SERVICE, AND UPGRADE AS NECESSARY.
- FENCING NOT SHOWN AROUND GATE OPERATOR FOR SAKE OF CLARITY



1 VERTICAL PIVOT GATE PLAN VIEW

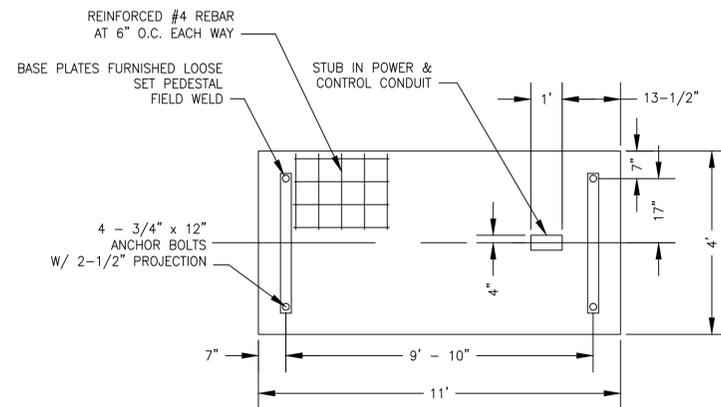
C802 SCALE: NTS

- LIST OF MATERIALS
 2 X 2 X .188 SQUARE TUBING
 4" SCHEDULE 40 PIPE
 LONG 2" SQ. TUBE SWAY BRACES
 1/4" ALUMINUM CAPS



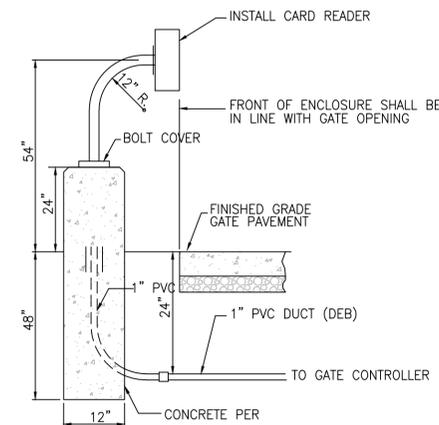
2 VERTICAL PIVOT GATE ELEVATION

C802 SCALE: NTS



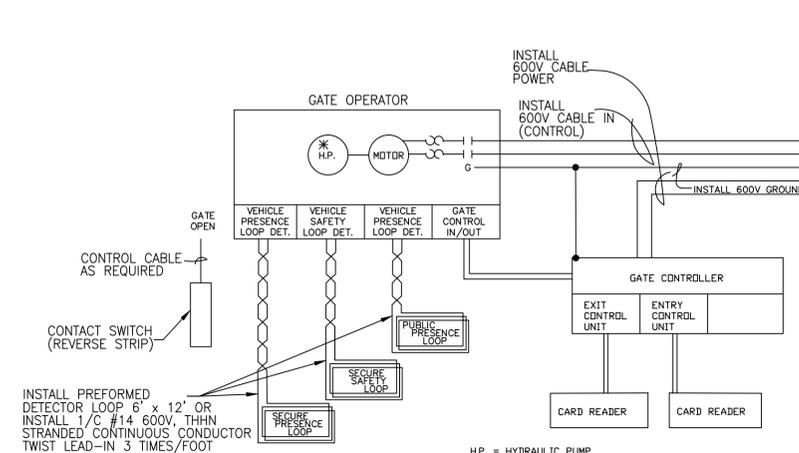
3 FOUNDATION DETAIL (PLAN VIEW)

C802 SCALE: NTS



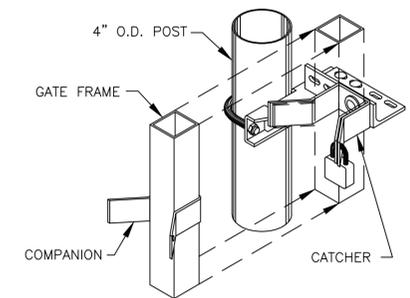
4 CARD READER PEDESTAL DETAIL

C802 SCALE: NTS



5 ACCESS GATE WIRING DIAGRAM

C802 SCALE: NTS



6 CATCH ASSEMBLY

C802 SCALE: NTS

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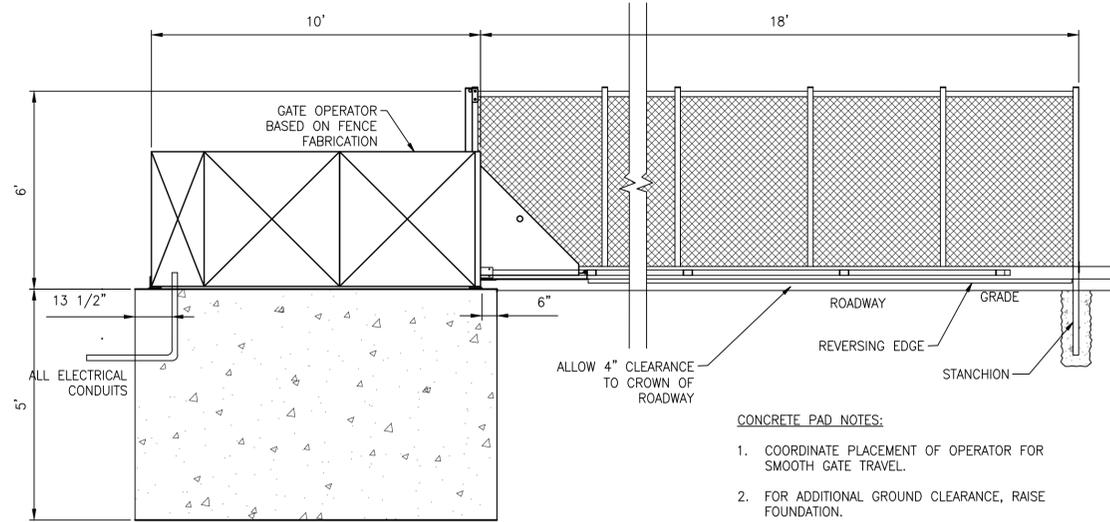
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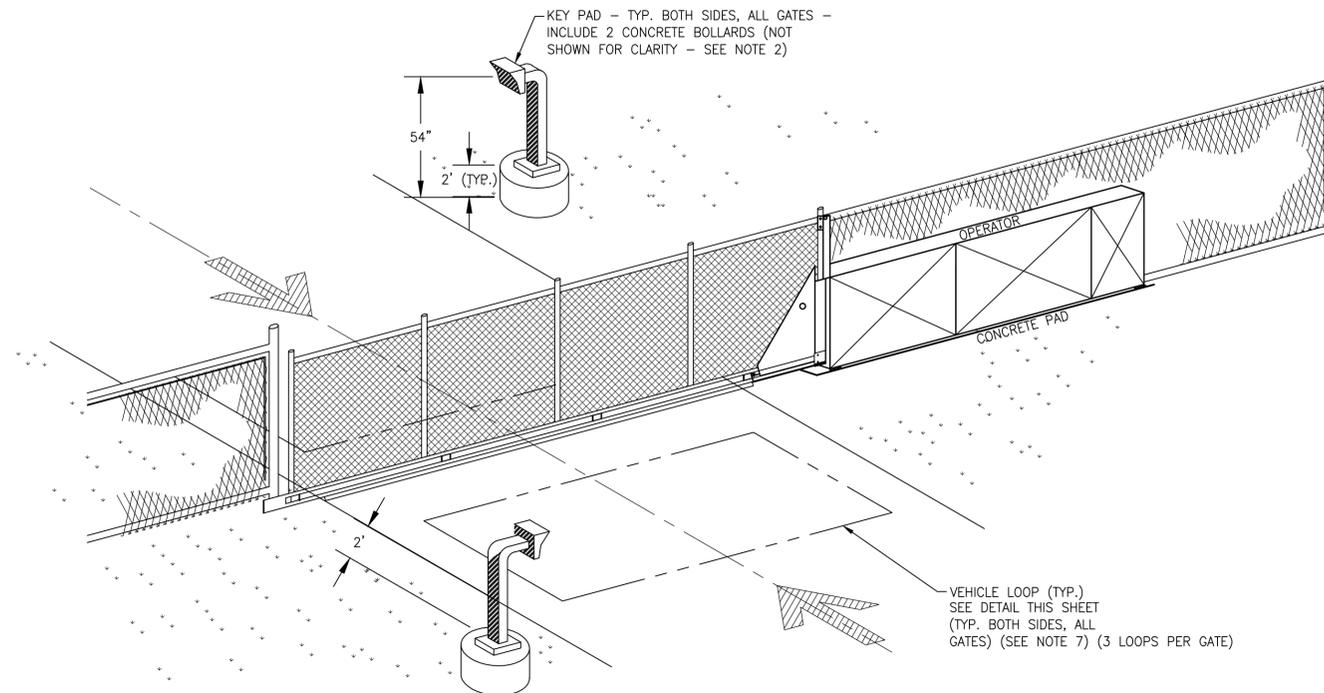


1 PIVOT GATE OPERATOR DETAIL

C803 SCALE: NTS GATE OPERATOR MUST BE LOCATED ON AIRPORT OPERATION AREA SIDE OF FENCING

VERTICAL PIVOT GATE NOTES:

- PROPOSED HYDRAULIC GATE OPERATORS SHALL BE IDEAL HYJD-25, OR APPROVED EQUAL. VOLTAGES AND HORSEPOWERS SHALL BE AS DETAILED. OPERATORS SHALL HAVE FULL SYSTEM CAPABILITIES AND MUST BE INTEGRATED WITH EXISTING CHECKPOINT ACCESS AND CONTROL SYSTEM. THE OPERATOR SHALL BE MOUNTED ON A FOUNDATION PER DETAIL #3 SHEET C802.
- PROXIMITY CARD READERS SHALL BE PROVIDED AS DETAILED PER SPECIFICATIONS. CONTROL SHALL BE VIA FIBER OPTIC CABLE AND SHALL BE INSTALLED IN PVC CONDUIT FROM CARD READERS TO GATE OPERATOR. PROVIDE TWO (2) CONCRETE BOLLARDS AROUND EACH CARD READER FOR PROTECTION.
- PROVIDE PHOTO EYES AT EACH GATE FOR OBSTRUCTION SENSING. THE INFERRED PHOTO EYES SHALL BE EMX INDUSTRIES, INC. MODEL IRB-325 OR APPROVED EQUAL. AN INLINE CONTROL SWITCH MUST ALSO BE PROVIDED AT EACH PHOTO EYE FOR MANUAL OPERATION CONTROL WIRING SHALL BE INSTALLED IN PVC CONDUIT FROM EACH PHOTO EYE TO GATE OPERATOR.
- THE CONTRACTOR SHALL PROVIDE A TRANSMITTER WITH AUDIBLE ALARM ON EACH GATE. THE TRANSMITTER SHALL BE MILLER EDGE MODEL MWT02 OR APPROVED EQUAL. EACH GATE SHALL BE EQUIPPED WITH A CONTACT SAFETY DEVICE ON THE BOTTOM EDGE OF THE GATE. THE CONTACT SAFETY EDGE SHALL BE MILLER EDGE ME123 SENSING EDGE OR APPROVED EQUAL.
- EXACT LAYOUT FOR EACH GATE OPERATOR SYSTEM IS DIFFERENT. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO COORDINATE EXACT LAYOUT WITH THE AIRPORT AND ENGINEER PRIOR TO AND DURING CONSTRUCTION.
- PROPOSED GATE OPERATORS SHALL BE OPERATED MANUALLY, BY PROXIMITY KEY CARD ACCESS, AND BY REMOTE TRANSMITTERS. ALL ENCLOSURES SHALL BE CONFIGURED IN SUCH A WAY THAT ALL ELECTRONIC COMPONENTS ARE PROTECTED FROM INCLEMENT WEATHER WHEN THE ENCLOSURE IS OPEN.
- PROVIDE 1/2" PVC CONDUIT FOR LOOP WIRING FROM LOOP TO GATE OPERATOR (3 LOOPS PER GATE).
- ALL ITEMS ASSOCIATED WITH INSTALLATION OF PROPOSED HYDRAULIC GATES (CONDUITS, WIRING, DISCONNECTS, CARD READERS, BOLLARDS, SENSOR LOOPS, CONTROL STATIONS, KEY CARDS, W/ (GFCI) RECEPTACLES, POWER PANELS ETC.) SHALL BE CONSIDERED INCIDENTAL TO EACH GATE OPERATOR AT EACH LOCATION. EACH GATE OPERATOR SHALL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE, WHICH PRICE SHALL INCLUDE THE ASSOCIATED ITEMS SHOWN ON THE PLANS AND AS REQUIRED TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.



2 TYPICAL ELECTRIC GATE LAYOUT DETAIL

C803 SCALE: NTS

SAFETY LOOP NOTES

THE FOLLOWING CHART MUST BE UTILIZED WHEN INSTALLING A LOOP USED FOR VEHICLE DETECTION. THIS CHART LISTS THE PREDETERMINED NUMBER OF TURNS THAT MUST BE MADE BY THE ACTUAL LOOP WIRES IN ORDER TO CREATE AN ACCEPTABLE INDUCTANCE RANGE.

LOOP DIMENSION	NUMBER OF TURNS	LOOP AREA
A) 2' X 6'	6	A) 6 - 12
B) 2'-6" X 6'	5	B) 12 - 20
C) 4' X 8'	4	C) 20 - 60
D) 6' X 9'	3	D) 60 - 240
E) 12' X 20'	2	E) 240 & UP

DUE TO THE LOSS OF INDUCTANCE CAUSED BY A DISTANCE GREATER THAN 490 FEET FROM THE LOOP TO THE GATE DEVICE, AN ADDITIONAL TURN OF LOOP WIRE IS RECOMMENDED DURING INSTALLATION.

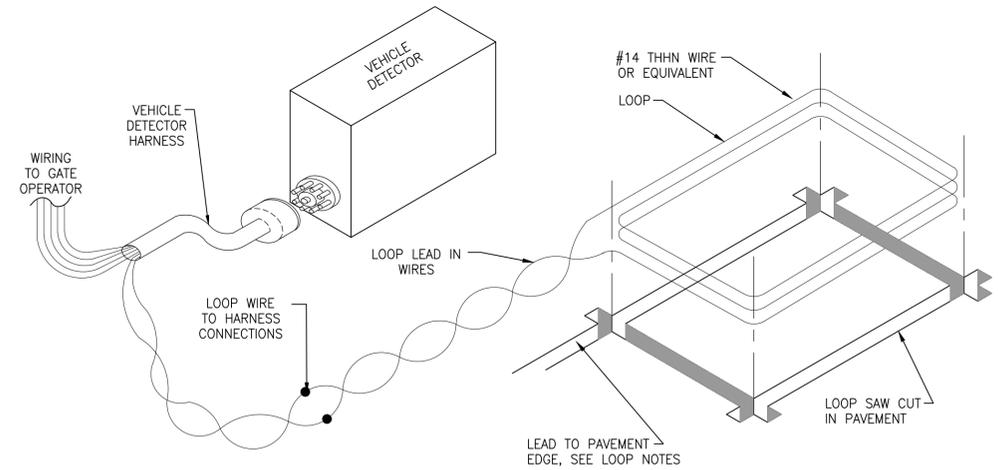
A CLEAN, SMOOTH SAW SLOT MUST BE CUT INTO THE PAVEMENT WHERE THE LOOP IS TO BE INSTALLED. THE INDUSTRY STANDARD REQUIRES THIS SLOT TO BE A MINIMUM OF 1-1/2" AND A MAXIMUM OF 3-1/2" DEEP AS A GENERAL RULE. WHEN A SOFTER PAVEMENT MATERIAL IS PRESENT, THE GREATER SAW CUT DEPTH IS PREFERRED. THIS PROTECTS THE LOOP WIRES FOR A LONGER PERIOD OF TIME.

AFTER THE LOOP SAW SLOTS HAVE BEEN CLEARED OUT, PROCEED TO TUCK THE WIRE IN THE SLOTS WITH AN OBJECT THAT WILL NOT INJURE THE WIRE INSULATION. WIND THE ACTUAL LOOP WITH #14 THHN STRANDED WIRE OR EQUIVALENT. THE WIRE MUST BE RATED FOR DIRECT BURIAL AND IMPERVIOUS TO MOISTURE. THIS WILL AVOID CHANGES IN THE DIELECTRIC CONSTANT OF THE WIRE INSULATION WHICH MAY CAUSE EXCESSIVE INDUCTANCE DRIFT. IT IS EXTREMELY IMPORTANT THAT THE LOOP BE WOUND WITH ONE CONTINUOUS LENGTH OF WIRE. THERE ARE ABSOLUTELY **NO SPLICES PERMITTED!**

THE TWO WIRES THAT LEAVE THE LOOP AT THE CURB OR PAVEMENT AFTER THE LOOP HAS BEEN PROPERLY WOUND, MUST BE TWISTED AT A MINIMUM OF 5 TURNS PER FOOT AND TAPED TOGETHER WITH (UL) APPROVED ELECTRICAL TAPE TO PREVENT THE WIRES FROM MOVING. FAILURE TO TWIST AND SECURE THESE WIRES MAY PRODUCE A FALSE SIGNAL FROM THE LOOP.

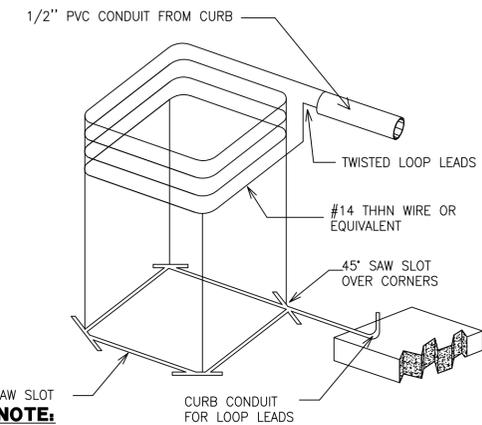
WHEN THE LOOP INSTALLATION HAS BEEN COMPLETED, CHOOSE A SEALANT THAT CLOSELY MATCHES THE TYPE OF PAVEMENT MATERIAL PRESENT. INDUSTRY RECOMMENDS (3M) LOOP DETECTOR SEALANT. HARD SETTING EPOXIES SHOULD NOT BE USED WITH ASPHALT. AVOID HIGH TEMPERATURE SEALANTS.

VEHICLE DETECTION LOOPS SHALL BE THREE PER GATE AND BE CONFIGURED FOR SAFETY ONLY. ALL LOOPS SHALL BE INSTALLED TO MANUFACTURERS SPECIFICATIONS AND FIELD LOCATED BY CONTRACTOR AND ENGINEER. LOOPS SHALL BE SAWCUT INTO SOUND PAVEMENT. WHERE PAVEMENT IS CRACKED, BROKEN OR OTHERWISE UNSOUND, LOOPS SHALL BE INSTALLED IN SCHEDULE 80 PVC AND LOCATED IN THE GRANULAR BASE PRIOR TO NEW PAVING BY OTHERS.



3 PROPOSED SAFETY LOOP DETECTOR INSTALLATION DETAIL

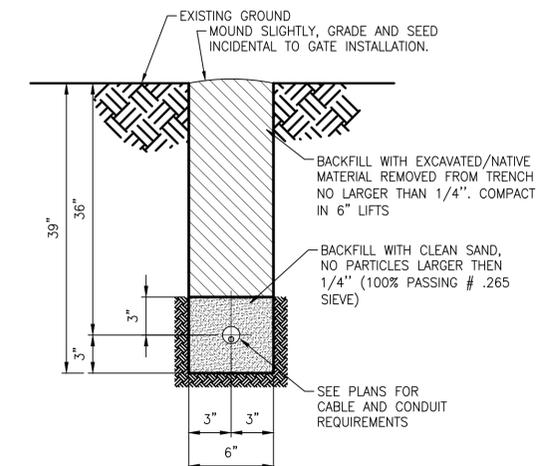
C803 SCALE: NTS



WARNING DO NOT INSTALL LOOP WITHIN 12 INCHES OF ANY CABLES OR CONDUITS.
DO NOT INSTALL LOOP WITHIN 2 INCHES OF ANY STEEL REINFORCEMENTS NOR ANY PAVEMENT JOINTS

4 SAFETY LOOP INSTALLATION DETAIL

C803 SCALE: NTS



5 CONDUIT TRENCH DETAIL (IN TURF)

C803 SCALE: NTS

RS&H

Reynolds, Smith and Hills, Inc.
4525 Airport Approach Road, Suite A
Duluth, Minnesota 55811
218-722-1227 FAX 218-722-1052
www.rsandh.com

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