

07SR023

CONSTRUCTION PLANS

FOR

**RAPID CITY
REGIONAL AIRPORT**

RAPID CITY, PENNINGTON COUNTY, SOUTH DAKOTA

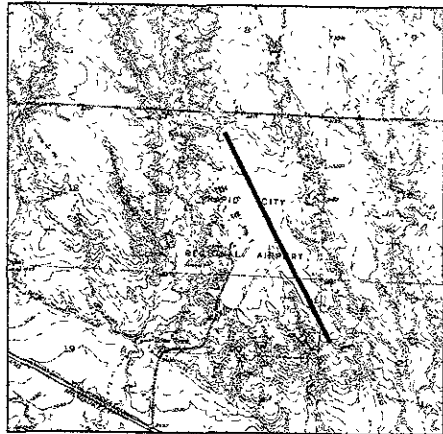
RAPID CITY REGIONAL AIRPORT BOARD

May 2007

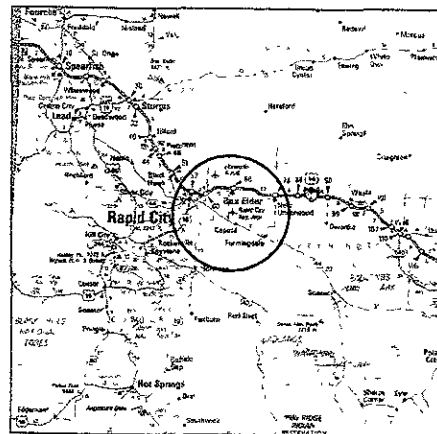
AIP NO. 3-46-0048-031-2004 & 032-2005

RUNWAY 14-32 / TAXIWAY SEPARATION PROJECT

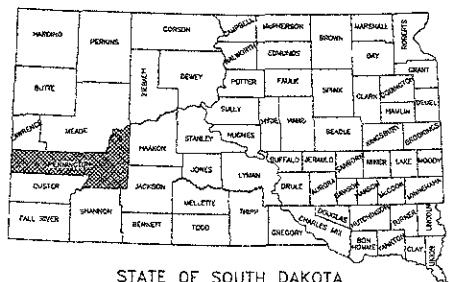
WATER MAIN CONSTRUCTION & MISCELLANEOUS ITEMS



LOCATION MAP



VICINITY MAP



STATE OF SOUTH DAKOTA

prepared by
KADRMAS, LEE & JACKSON, INC
330 Knollwood Drive
P.O. Box 3416
Rapid City, SD 57701
Ph. (605) 721-5553

3237 East Broadway
P.O. Box 1157
Bismarck, ND 58502
Ph (701) 355-8400

PRELIMINARY

NOT FOR
CONSTRUCTION 3-28-07

Rapid City
Management Dept.

APR 02 2007

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prepared for
RAPID CITY REGIONAL AIRPORT BOARD

SPONSORS APPROVAL

I HEREBY APPROVE THESE PROJECT PLANS AND SPECIFICATIONS, CERTIFIED BY A LICENSED PROFESSIONAL ENGINEER THAT THEY HAVE BEEN DEVELOPED TO THE BEST OF HIS PROFESSIONAL ABILITY IN ACCORDANCE WITH FEDERAL STANDARDS AS SET FORTH IN THE FAA ADVISORY CIRCULARS AND THAT NO DEVIATIONS WILL BE NECESSARY OTHER THAN THOSE PREVIOUSLY APPROVED BY THE FAA

CITY OF RAPID CITY REGIONAL AIRPORT BOARD

DATE: _____

ACCEPTED

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

BRUCE LINDHOLM, P.E.
PROGRAM MANAGER
OFFICE OF AERONAUTICS

DATE: _____

ENGINEER CERTIFICATION

I HEREBY CERTIFY THAT TO THE BEST OF MY PROFESSIONAL ABILITY THESE PLANS AND SPECIFICATIONS WERE DEVELOPED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH ALL APPLICABLE FEDERAL STANDARDS AND REQUIREMENTS, AND THAT NO DEVIATION FROM OR MODIFICATIONS TO STANDARDS AS SET FORTH IN THE FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULARS WILL BE NECESSARY OTHER THAN THOSE PREVIOUSLY APPROVED BY THE FAA

P.E. _____

DATE: _____

Rev.	Des.	Description	Rev.	Chr.	Apprv.

RAPID CITY REGIONAL AIRPORT
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
RAPID CITY, SOUTH DAKOTA

**Kadmas
Lee &
Jackson**
Engineers, Surveyors
and Planners

TITLE SHEET

Drawn by: _____
Checked by: _____
Date: 03/19/2007

PROJ #10507106

PROJ #10507106
RAPID CITY REGIONAL AIRPORT

SHEET INDEX

- TITLE SHEET
- INDEX OF PLAN SHEETS
- 1 PROJECT WORK DESCRIPTION & BASIS OF ESTIMATE
- 2 GENERAL CONSTRUCTION SAFETY PLAN
- 3 CONSTRUCTION SAFETY PLAN PHASE S1, S2 & S3
- 4 CONSTRUCTION SAFETY PLAN PHASE N1, N2 & N3
- 5 EROSION CONTROL PLAN
- 6-8 WATER MAIN DETAILS
- 9-15 WATER MAIN - PLAN & PROFILE
- 16 FIRE HYDRANT - SECTIONS

PRELIMINARY

PROJECT CONTACT LIST:

GENERAL INFORMATION & CONSTRUCTION ITEMS
ROD SENN 605-721-5553

Rapid City Regional Airport		SHEET NO.	
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)			
RAPID CITY, SOUTH DAKOTA			
Kadmas Lee & Jackson		INDEX OF PLAN SHEETS	
Engineers, Surveyors and Planners	Sheet No. EAM	Scale or 1:5000*106	Last Revised 03/18/2007
D:\c2\p2\110507166\CAD\p2\110507166_shepl_index.dwg (user)			

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APR 02 2007

Rapid City Gr
Management Depa

PROJECT WORK DESCRIPTION

- ① INSTALL WATER MAIN & APPURTENANCES
- ② INSTALL WATER MAIN CASING PIPE

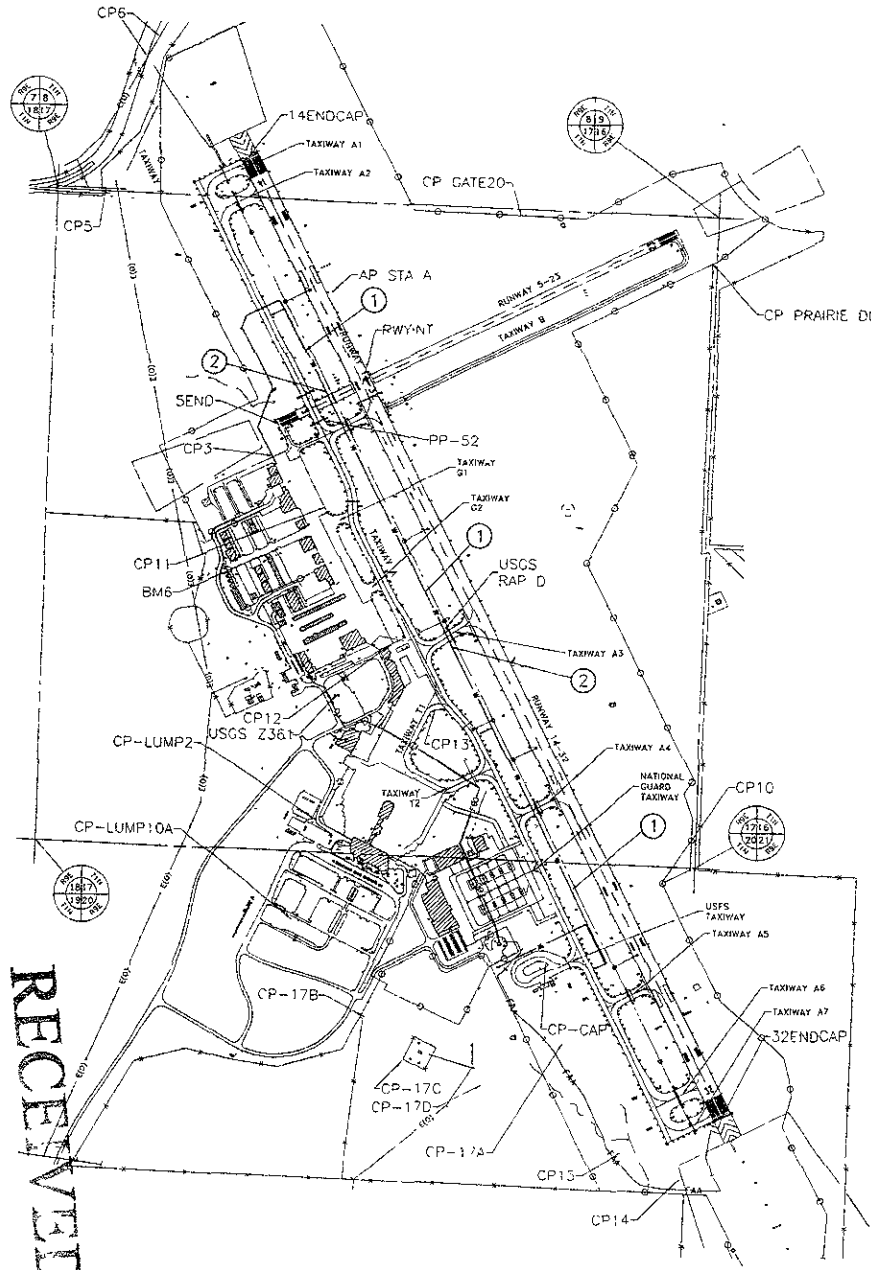
BASIS OF ESTIMATE

UNCLASSIFIED EXCAVATION (TOPSOIL) -	STRIP 4' OVER TRENCH EXCAVATION AREAS
WATER -	10 GAL /CY EXCAVATION/EMBANKMENT
TYPE 2 BEDDING MATERIAL -	89 T/CY
TYPE 3 FOUNDATION MATERIAL -	1.89 T/CY
PLANT MIX BITUMINOUS PAVEMENT CLASS D "TYPE 2 - 5" -	2 TONS/CY
ASPHALT CEMENT -	6.5% OF MIX
REMOVE & DISPOSE OF BITUMINOUS PAVEMENT* - FULL DEPTH -	AVERAGE DEPTH BITUMINOUS PAVEMENT - APPROX 4" DEPTH
TOPSOIL REPLACEMENT -	4" DEPTH X TRENCH NAT LINES LENGTH & WIDTH - 0.2 CY/LIN FT (CALCULATED)
CONTRACTOR FURNISHED DENSITY TESTS -	2 DENSITIES PER 200 LIN. FT OF TRENCH AND 2 DENSITIES PER 3 FT OF TRENCH WIDTH



BENCH MARK LIST						
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	STATION	OFFSET
BM 1	HORIZONTAL ANGLE BENCH	735.97 431	523.108 291	2129.931	STA 51+46.11	1.17 FT RUNWAY 14-35
BM 2	TOPGRAPHIC ANGLE BENCH	632.733 911	524.183 291	2130.811	STA 14+81.23	1.23 FT RUNWAY 14-35
BM 3	BENCH MARK BUSH	632.492 911	521.331 491	2129.321	STA 52+62.40	4.45 FT RUNWAY 14-35

AIRPORT CONTROL						
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	STATION	OFFSET
AP STA A	TEMPORARY CONTROL BENCH	637.800 304	525.182 255	2129.931	STA 51+46.11	13.36 FT R PAVL 14-35
14ENDCAP	CP	632.823 394	525.004 911	2129.321	STA 14+81.23	3.00 FT R PAV 14-35
SEND	CP	637.211 011	520.724 944	2129.321	STA 14+81.23	22.82 FT RUNWAY 14-35
BM6	CP	637.883 333	520.428 944	2129.321	STA 14+81.23	13.06 FT RUNWAY 14-35
CP CONTROLLER	CP	637.702 153	525.228 044	2129.321	STA 14+81.23	13.55 FT RUNWAY 14-35
CP TASTEN	CP	637.005 394	525.761 033	2129.321	STA 14+81.23	7.22 FT RUNWAY 14-35
CP GATE 20	CP	635.436 114	523.589 323	2129.321	STA 52+62.40	12.25 FT RUNWAY 14-35
CP JEFF	CP	637.333 923	525.335 603	2129.321	STA 52+62.40	841.70 FT RUNWAY 14-35
CP ORV	CP	637.876 977	525.510 823	2129.321	STA 52+62.40	13.74 FT RUNWAY 14-35
CP PRAIRIE DOG	CP	635.008 284	524.742 203	2129.321	STA 51+46.11	39.76 FT RUNWAY 14-35
CP11	PK HNL	635.030 284	524.742 203	2129.321	STA 51+46.11	311.60 FT RUNWAY 14-35
CP13	PGB-R	636.426 388	520.707 703	2129.321	STA 14+81.23	202.90 FT RUNWAY 14-35
CP12	REBAP	637.733 171	520.564 171	2129.321	STA 30+11.10	480.00 FT RUNWAY 14-35
CP14	REBAP	636.823 731	529.347 235	2129.321	STA 14+81.23	1186.50 FT RUNWAY 14-35
CP15	REBAP	639.874 271	529.789 171	2129.321	STA 14+81.23	334.83 FT RUNWAY 14-35
CP16	REBAP	639.874 271	529.789 171	2129.321	STA 14+81.23	1829.84 FT RUNWAY 14-35
CP17	REBAP	631.054 071	521.472 721	2129.321	STA 14+81.23	1682.03 FT RUNWAY 14-35
CP-TEMP	REBAP	636.636 581	523.501 381	2129.321	STA 14+81.23	403.70 FT RUNWAY 14-35
PP-52	CP ALUMINUM CAP	636.221 381	521.617 811	2129.321	STA 14+81.23	780.70 FT RUNWAY 14-35
RWTINT	REP	637.643 331	521.418 701	2129.321	STA 14+81.23	3.11 FT RUNWAY 14-35



NOTE: TECHNICAL MATERIAL AND INSTALLATION SPECIFICATIONS WILL BE THE CURRENT EDITION OF THE CITY OF RAPID CITY STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

PRELIMINARY

RECEIVED
APR 02 2007
Rapid City Growth Management Department

Rev'd
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
RAPID CITY SOUTH DAKOTA

PROJECT WORK DESCRIPTION & BASIS OF ESTIMATE

Kadmas Lee & Jackson
Engineers, Surveyors and Planners
1000 N. 17th St., Rapid City, SD 57701
Phone: 605/328-2001 Fax: 605/328-2002

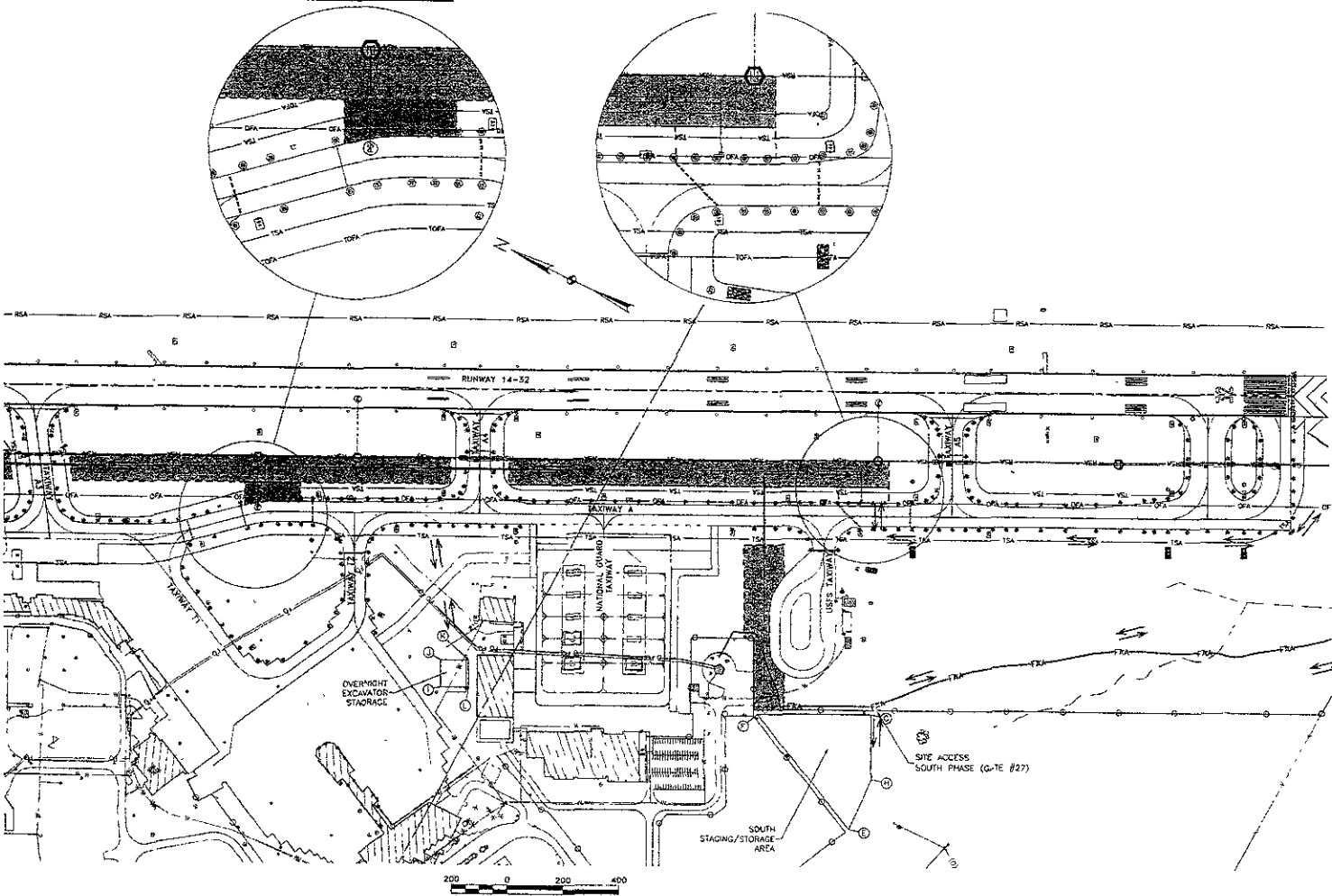
DATE OF PREPARED: 05/28/2007
DRAWN BY: JLS
CHECKED BY: JLS
DATE OF ISSUE: 05/28/2007
PROJECT NO: 100004103
SHEET NO: 1

GENERAL CONSTRUCTION SAFETY.
SEE SHEET #2 (GENERAL CONSTRUCTION SAFETY PLAN) FOR GENERAL CONSTRUCTION SAFETY PROJECT NOTES AND LIMITATION OF SAFETY PLAN

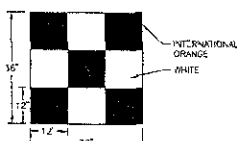
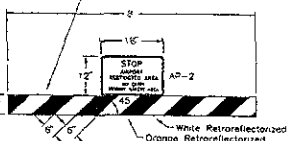
WORK PHASING - PHASE S1.
DURING PHASE S1 THE CONTRACTOR SHALL CONSTRUCT THE 12" WATERMAIN AND ASSOCIATED APPURTENANCES ON THE SOUTH END. ALL WORK SHALL BE PERFORMED WITH TAXWAY 6 AND RUNWAY 14-32 OPEN FOR USE. 20% OF TRENCH CAN REMAIN OPEN EACH DAY. ALL OTHER TRENCH SHALL BE BACKFILLED AT THE END OF EACH WORK DAY. ALL EQUIPMENT EXCEPT FOR TRACK TYPE EXCAVATORS SHALL BE PARKED IN THE CONTRACTOR'S STORAGE/STAGING AREA AT THE END OF EACH WORK DAY. TRACK TYPE EXCAVATORS MAY BE PARKED IN THE OVERNIGHT EXCAVATOR STORAGE AREA. CONTRACTOR WILL BE REQUIRED TO CLEAN ALL TAXWAYS AND PAVEMENT SURFACES IN AIR OPERABLE AREAS EVERY TIME A VEHICLE CROSSES THE AREA. CONTRACTOR SHALL SCHEDULE AND PLAN CONSTRUCTION OPERATIONS TO MINIMIZE THE NEED TO CROSS ACTIVE TAXWAYS, AIR, GROUND AND NORMAL TRAFFIC LANES. CONTRACTOR WILL NEED TO BE ESCORTED ACROSS THESE LANES BY THE ENGINEER OR AIRPORT PERSONNEL.

WORK PHASING - PHASE S2.
DURING PHASE S2 THE CONTRACTOR SHALL CONSTRUCT 6" PVC HYDRANT LEAD INSTALLATION & HYDRANT VALVE AT STA. 78+32 TO 81+32. FOR THIS WORK TAXWAY A WILL BE CLOSED FROM SOUTH RADIUS OF USFS TAXWAY TO NORTH RADIUS OF TAXWAY AS THIS WORK CAN BE DONE AT ANY TIME DURING PHASE S1. ALL WORK IN THIS PHASE MUST BE PERFORMED WITHIN THE CONSTRUCTION LIMITS SHOWN. CONTRACTOR WILL HAVE 3 DAYS TO COMPLETE PHASE S2.

WORK PHASING - PHASE S3.
DURING PHASE S3 THE CONTRACTOR SHALL CONSTRUCT 6" PVC HYDRANT LEAD INSTALLATION & HYDRANT VALVE AT STA. 35+30 TO 38+30. FOR THIS WORK TAXWAY A WILL BE CLOSED FROM SOUTH RADIUS OF TAXWAY 1 TO NORTH RADIUS OF TAXWAY 2. THIS WORK CAN BE DONE AT ANY TIME DURING PHASE S1. ALL WORK IN THIS PHASE MUST BE PERFORMED WITHIN THE CONSTRUCTION LIMITS SHOWN. CONTRACTOR WILL HAVE 3 DAYS TO COMPLETE PHASE S3.



BARRICADE SUPPLIED BY THE AIRPORT AND INSTALLED BY THE CONTRACTOR



NOTES:

1. ALL WARNING DEVICES SHALL MEET THE REQUIREMENTS OF PART 6 OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)
2. ALL WARNING LIGHTS SHALL BE KEPT IN OPERATIONAL ORDER BY CONTRACTOR
3. THE LAYOUTS ARE A MINIMUM REQUIREMENT NECESSARY TO ASSIST CONTRACTOR IN DETERMINING COST FOR PROVIDING NECESSARY TRAFFIC CONTROL. THE CONTRACTOR MAY ADD ADDITIONAL WARNING DEVICES UPON APPROVAL OF THE ENGINEER

LEGEND

- SAFETY BARRICADE WITH SIGNAGE & RE. WARNING LIGHT (LOW INTENSITY OPERATING DUSK TO DAWN)
- - - LIMITS OF CONSTRUCTION AREA
- TRAFFIC FLOW PATTERN

PRELIMINARY

RIV. # RAPID CITY REGIONAL AIRPORT RAPID CITY REGIONAL AIRPORT BOARD (OWNER) PHASE 01 SOUTH PHASE		SHEET NO 3
Kadrmas Lee & Jackson Engineers, Surveyors and Planners	CONSTRUCTION SAFETY PLAN PHASE S1, S2 & S3	
DATE OF DES/ELU 02/19/2007	DRAWING NO. 1050-1103	LOT NUMBER 02/19/2007

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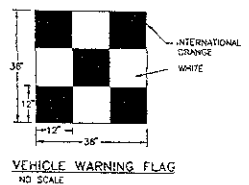
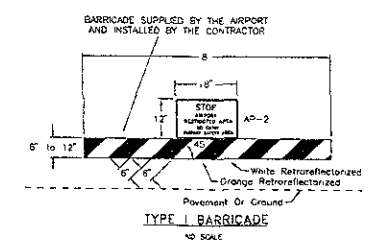
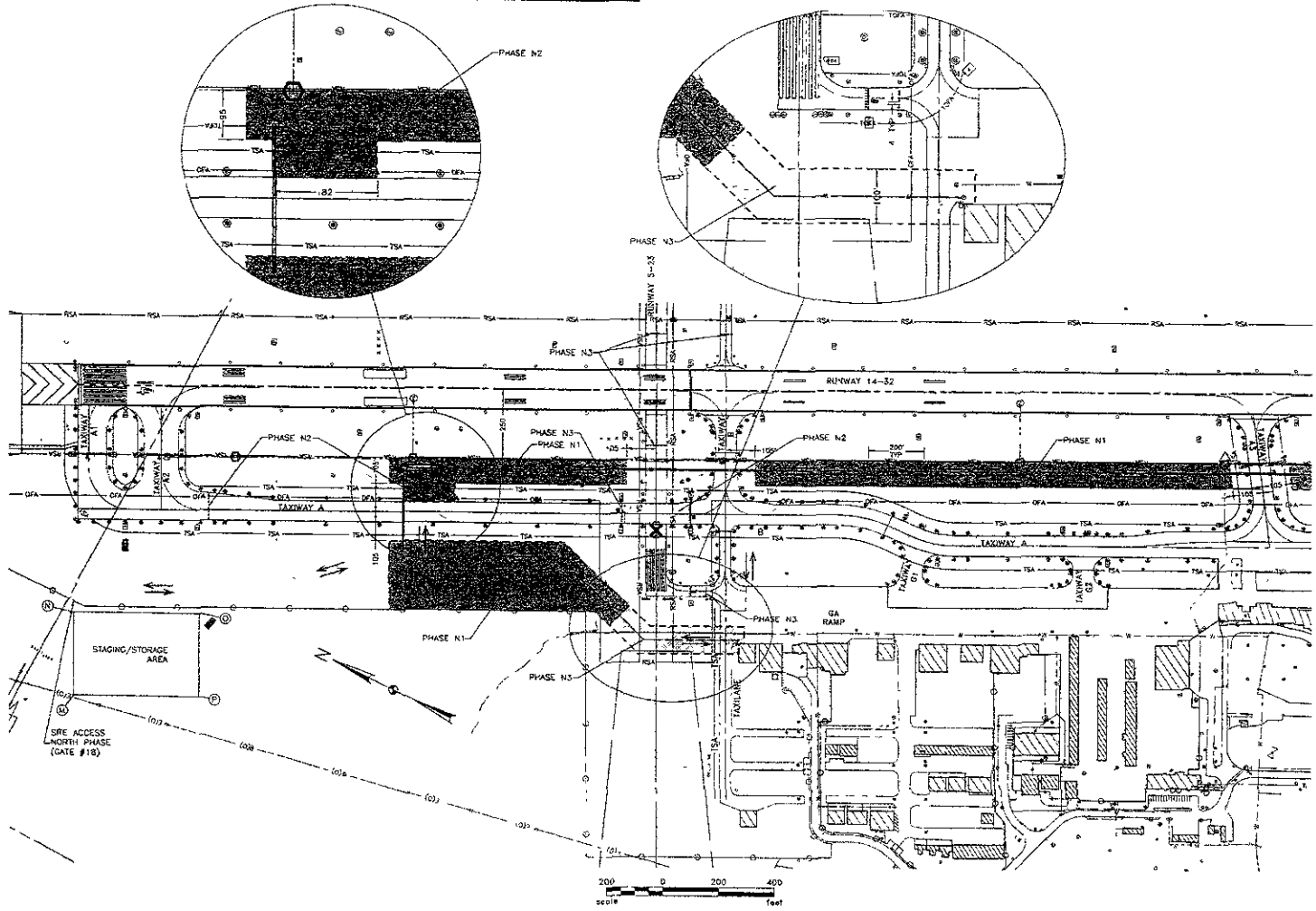
GENERAL CONSTRUCTION SAFETY.
SEE SHEET #2 (GENERAL CONSTRUCTION SAFETY PLAN) FOR GENERAL CONSTRUCTION SAFETY PROJECT NOTES AND LIMITATION OF SAFETY PLAN

WORK PHASING - PHASE N1.
DURING PHASE N1, THE CONTRACTOR SHALL CONSTRUCT THE 12" WATERMAIN AND ASSOCIATED APPURTENANCES ON THE NORTH END. ALL WORK SHALL BE PERFORMED WITH TAXIWAY A AND RUNWAY 14-32 OPEN FOR USE. 200' OF TRENCH CAN REMAIN OPEN EACH DAY. ALL OTHER TRENCH SHALL BE BACKFILLED AT THE END OF EACH WORK DAY. ALL EQUIPMENT SHALL BE PARKED IN THE CONTRACTOR'S STORAGE/STAGING AREA AT THE END OF EACH WORK DAY. CONTRACTOR WILL BE REQUIRED TO CLEAN ALL TAXIWAYS AND PAVEMENT SURFACES IN AIR OPERATIONS AREAS EVERY TIME A VEHICLE CROSSES THE AREA. CONTRACTOR SHALL SCHEDULE AND PLAN CONSTRUCTION OPERATIONS TO MINIMIZE THE NEED TO CROSS ACTIVE TAXIWAYS, AIR DRIVING AND NORMAL TRAFFIC LANES. CONTRACTOR WILL NEED TO BE ESCORTED ACROSS THESE LANES BY THE ENGINEER OR AIRPORT PERSONNEL.

WORK PHASING - PHASE N2.
DURING PHASE N2, THE CONTRACTOR SHALL CONSTRUCT THE 6" PVC HYDRANT LEAD, INSTALL HYDRANT & HYDRANT VALVE AT STA. 17+00 RT. FOR THIS WORK TAXIWAY WILL BE CLOSED FROM SOUTH RADIUS OF TAXIWAY A2 TO NORTH OF RUNWAY 5-23. THIS WORK CAN BE DONE AT ANY TIME DURING PHASE N1. ALL WORK IN THIS PHASE MUST BE PERFORMED WITHIN THE CONSTRUCTION LIMITS SHOWN. CONTRACTOR WILL HAVE 3 DAYS TO COMPLETE PHASE N2.

WORK PHASING - PHASE N3.
DURING PHASE N3, RUNWAY 5-23, TAXIWAY B AND TAXIWAY C WILL BE CLOSED. THE CONTRACTOR SHALL CONSTRUCT THE 12" WATERMAIN AND ASSOCIATED APPURTENANCES FROM STA. 0+00 TO 4+30 THROUGH RUNWAY 5-23. ALL WORK SHALL BE PERFORMED WITH TAXIWAY A AND RUNWAY 14-32 OPEN FOR USE. LIGHTED RUNWAY CLOSED MARKERS SHALL BE FURNISHED BY THE OWNER, AND PLACED OVER 5-23 NUMERALS BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE LIGHTED RUNWAY CLOSED MARKERS DURING THIS TIME, AND WILL SERVICE THEM PRIOR TO RETURNING THEM TO THE OWNER. DURING THIS PHASE THE CONTRACTOR SHALL DISABLE RUNWAY 5-23 AND TAXIWAY B EDGE LIGHTS. THE CONTRACTOR SHALL PLACE OWNER PROVIDED LOW PROFILE BARRICADES ON RUNWAY 2-3 AND TAXIWAY B AT THE EASTERN RSA LINE OF RUNWAY 14-32, AND AT NORTH RADIUS BETWEEN TAXIWAY B AND RUNWAY 5. DURING THIS PHASE 200' OF TRENCH CAN REMAIN OPEN EACH DAY. ALL OTHER TRENCH SHALL BE BACKFILLED AT THE END OF EACH WORK DAY. ALL EQUIPMENT SHALL BE PARKED IN THE CONTRACTOR'S STORAGE/STAGING AREA AT THE END OF EACH WORK DAY. CONTRACTOR WILL BE REQUIRED TO CLEAN ALL TAXIWAYS AND PAVEMENT SURFACES IN AIR OPERATIONS AREAS EVERY TIME A VEHICLE CROSSES THE AREA. CONTRACTOR SHALL SCHEDULE AND PLAN CONSTRUCTION OPERATIONS TO MINIMIZE THE NEED TO CROSS ACTIVE TAXIWAYS, AIR DRIVING AND NORMAL TRAFFIC LANES. CONTRACTOR WILL NEED TO BE ESCORTED ACROSS THESE LANES BY THE ENGINEER, OR AIRPORT PERSONNEL.

CONTRACTOR WILL HAVE 5 DAYS TO COMPLETE PHASE N3 AFTER WHICH \$2 500 PER DAY LIQUIDATED DAMAGES WILL BE ASSESSED. THIS TIME INCLUDES THE TIME FROM WHEN THE LIGHTED CLOSING CROSSBARS ARE PLACED TO WHEN THEY ARE REMOVED AND THAT PORTION OF TAXIWAYS A, B AND RUNWAY 5-23 ARE REOPENED.



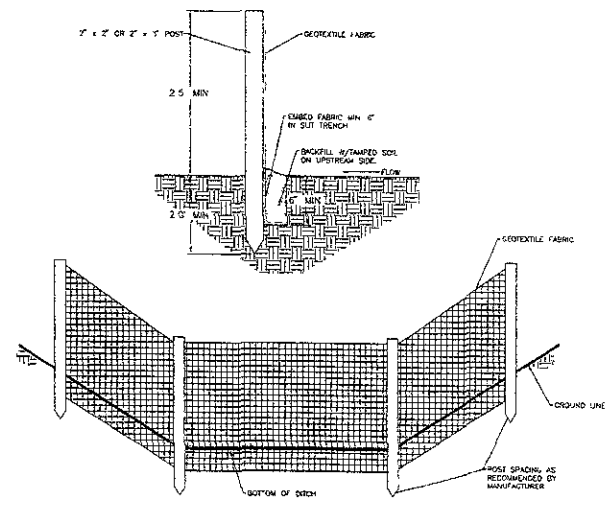
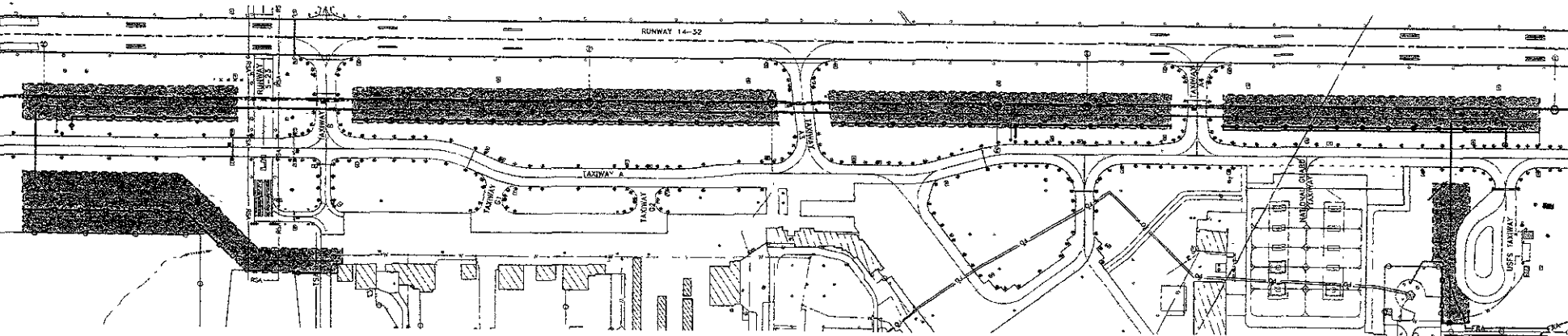
NOTES

1. ALL WARNING DEVICES SHALL MEET THE REQUIREMENTS OF PART 6 OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)
2. ALL WARNING LIGHTS SHALL BE KEPT IN OPERATIONAL ORDER BY CONTRACTOR
3. THE LAYOUTS ARE A MINIMUM REQUIREMENT NECESSARY TO ASSIST CONTRACTOR IN DETERMINING COST FOR PROVIDING NECESSARY TRAFFIC CONTROL. THE CONTRACTOR MAY ADD ADDITIONAL WARNING DEVICES UPON APPROVAL OF THE ENGINEER

- LEGEND**
- ☒ SAFETY BARRICADE WITH STORAGE & RED WARNING LIGHT (LOW INTENSITY OPERATING BUSK TO DOWN)
 - LIMITS OF CONSTRUCTION AREA
 - TRAFFIC FLOW PATTERN
 - ☒ LIGHTED CLOSING CROSS

PRELIMINARY

Rev'd		SHEET NO.	
RAPID CITY REGIONAL AIRPORT		4	
RAPID CITY REGIONAL BOARD (OWNER)		RAPID CITY SOUTH DAKOTA	
Kadmas Lee & Jackson	CONSTRUCTION SAFETY PLAN		DATE: 12/12/2007
	PHASE N, N1 & N2		
ENGINEER, SURVEYOR AND DESIGNER	DATE: 12/12/2007	SCALE: AS SHOWN	PROJECT: 1207106(C)RCD(04)1207106-0048



SILT FENCING
NO SCALE

EROSION CONTROL NOTES.

- 1 ALL SILT FENCING SHALL BE INSTALLED PRIOR TO BEGINNING CONSTRUCTION
- 2 THE CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES THROUGHOUT THE DURATION OF THE PROJECT
- 3 EROSION CONTROL MEASURES SHALL BE REMOVED OR REPLACED AS DIRECTED BY THE ENGINEER
- 4 STRAW WATTLES AND SILT FENCE LOCATIONS & QUANTITIES SHALL BE DETERMINED BY THE ENGINEER DURING CONSTRUCTION AND INSTALLED AS NEEDED

QUANTITIES:

SILT FENCE (AS NEEDED) = 1,300 LF
 WATTLES (AS NEEDED) = 5,000 LF

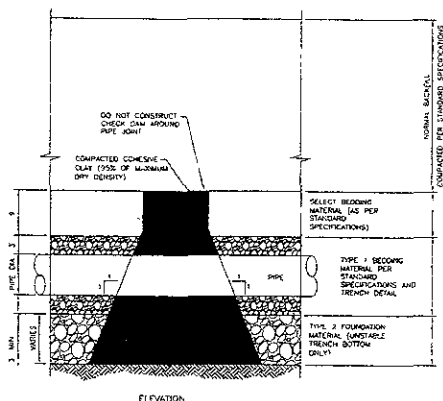
LEGEND

- SILT FENCE
- WATTLES
- LIMITS OF WORK AREA



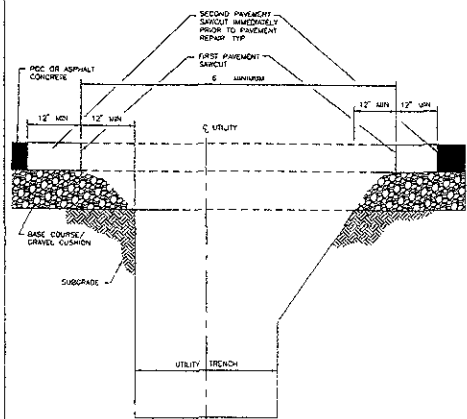
PRELIMINARY

Rev: 0		RAPID CITY REGIONAL AIRPORT		SHEET NO.	
		RAPID CITY REGIONAL AIRPORT BOARD (OWNER)		5	
		RAPID CITY SOUTH DAKOTA			
Kadmas Lee & Jackson		EROSION CONTROL PLAN			
ENGINEER: S. J. KADMAS		DATE: 11/19/2006	PROJECT NO: 15907106	DATE REVISED: 03/19/2006	
DRAWN BY: S. J. KADMAS		DATE: 11/19/2006	PROJECT NO: 15907106	DATE REVISED: 03/19/2006	



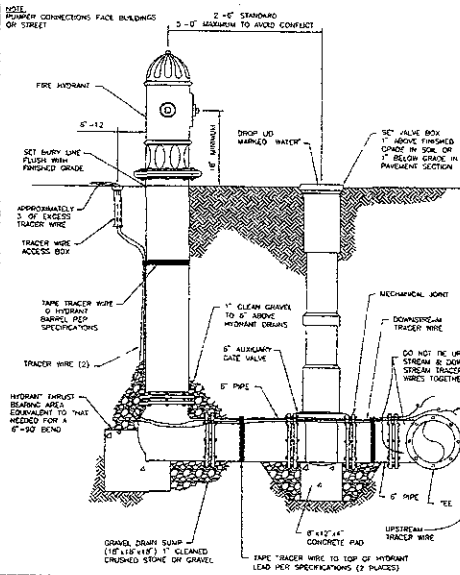
NOTE:
CHECK DAM INSTALLATION LOCATIONS SHALL BE AS INDICATED ON THE PLANS HOWEVER DURING CONSTRUCTION CHECK DAM INSTALLATION LOCATIONS MAY BE MOVED DUE TO FIELD CONDITIONS.
THE CHECK DAM SHALL EXTEND FROM THE BOTTOM OF THE EXCAVATION THROUGH THE BEDDING MATERIALS TO THE 'NORMAL' BENCH, AND SHALL EXTEND COMPLETELY TO EACH TRENCH SIDEWALL.
CHECK DAM MATERIAL SHALL BE COMPACTED COHESIVE CLAY THAT CONTAINS A MINIMUM OF 23% SANDS AND 20% SILT MATERIAL WITH 70% PASSING A #20 SIEVE. IF THE NORMAL EXCAVATED MATERIAL IS NOT SUITABLE FOR CONSTRUCTION OF THE CHECK DAM THEN THE CONTRACTOR SHALL OBTAIN MATERIAL FROM OUTSIDE SOURCES. CHECK DAM INSTALLATION AND MATERIAL SHALL BE CONSIDERED AS INCIDENTAL TO THE PIPE INSTALLATION.

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
TYPICAL TRENCH CHECK DAM DETAIL FOR WATER & SEWER MAINS
DATE 11-15-02 SEC 11-2 SHIT

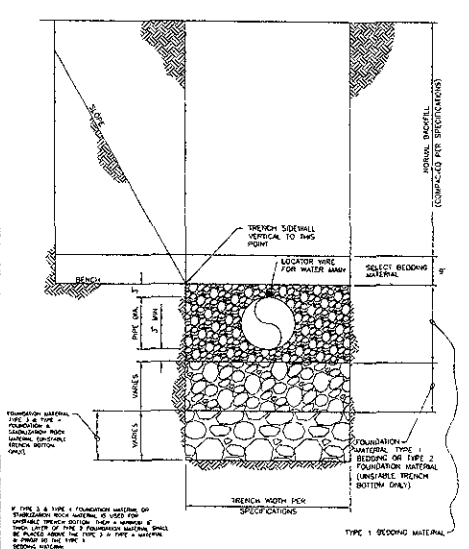


NOTES:
1. ALL SAND/ST TO BE FULL DEPTH.
2. BASE COURSE A AC THICKNESS TO MATCH EXISTING BUT IN NO CASE WILL BE LESS THAN 6\"/>

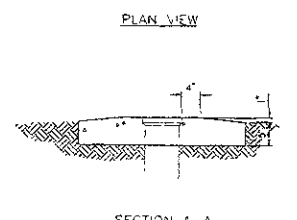
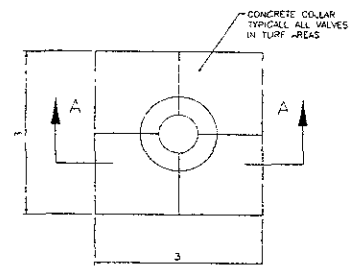
CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
UTILITY TRENCH PATCH DETAIL
DATE 3-23-04 SEC 41-1 SHIT



CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
HYDRANT SETTING DETAIL
DATE 11-20-02 SEC 8-1 SHIT



CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
TRENCH DETAIL FOR WATER & SEWER MAIN
DATE 11-20-02 SEC 11-3 SHIT



CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
CONCRETE VALVE BOX COLLAR
N T S

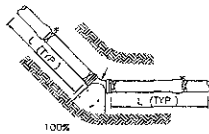
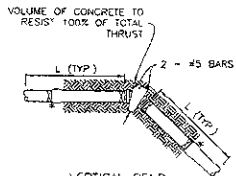
PRELIMINARY

Rev 0
RAPID CITY REGIONAL AIRPORT
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
RAPID CITY, SOUTH DAKOTA

Kadmas Lee & Jackson Engineers, Surveyors and Planners	<p>Sheet No. 6</p> <p>WATER MAIN DETAILS</p> <p>DATE: 10/26/2007 DWG BY: 10507106 CHECKED BY: 10507106 PROJECT: 10507106 CAD/plan/watermain_details.dwg</p>
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NOTES

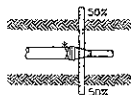
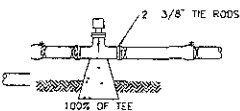
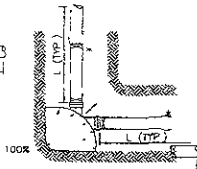
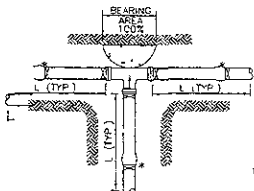
- 1 CONCRETE FOR THRUST BLOCKS & THRUST COLLARS SHALL BE 4000 P.S.I., CAST-IN-PLACE POURED AGAINST UNDISTURBED EARTH
- 2 WRAP PIPE FITTING WITH POLYETHYLENE WRAPPING PRIOR TO POURING THRUST BLOCK
- 3 FIGURE (100%) AT THRUST BLOCK INDICATES PERCENT OF TOTAL THRUST TO BE APPLIED FOR BEARING AREA. SEE TABLE FOR BEARING AREA OF THRUST BLOCK
- 4 ARROWS INDICATE THRUST DIRECTION
- 5 IN POOR SOILS ENGINEER WILL DETERMINE INCREASE IN THRUST BEARING AREA OR MAY REQUIRE USE OF RESTRAINING FITTINGS
- 6 CONTRACTOR MAY USE MECHANICAL JOINT RESTRAINTS IN LIEU OF CONCRETE THRUST BLOCKS WITH PRIOR APPROVAL OF ENGINEER
- 7 RODS AND STRAPS SHALL BE COATED WITH CORROSION RESISTANT MATERIAL
- 8 PLACE THRUST BLOCKS BEHIND TAPPING SLEEVES GREATER THAN 4" DIA
- 9 RESTRAINED JOINTS REQUIRED ON ALL JOINTS WITH (L) DISTANCE FITTINGS



RESTRAINED JOINTS

L = REQUIRED RESTRAINED LENGTH OF PIPE

VERTICAL BEND



INCREASER

VALVE

THRUST BLOCK DETAILS

NT 5

100% BEARING AREAS FOR THRUST BLOCKING (SF)

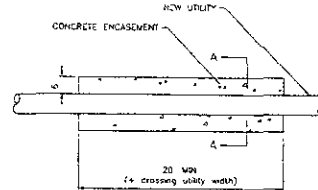
FITTING SIZE	TEES & PLUGS	90° BEND	45° BEND & WYES	REDUCERS - 11 1/4" & 22 1/2" BENDS
6	3.0	4.2	2.3	1.2
8	5.4	7.6	4.0	2.0
10	8.6	12.2	6.6	3.2
12	12.2	17.4	9.5	4.7

(TABLE IS BASED ON 150 PSI MAIN PRESSURE AND 2000 PSF SOIL BEARING PRESSURE)

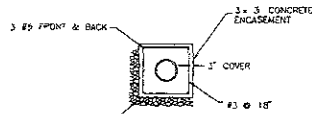
CALCULATED (L) - RESTRAINED LENGTH

FITTING SIZE	TEES & PLUGS	HORIZ. BEND 90°	45°	VERT. BEND 90°	45°	REDUCERS & VALVES
6	6	8	3	10	5	-
8	12	10	4	12	6	14
10	23	12	5	15	7	25
12	33	14	6	18	9	35

* REDUCERS - RESTRAINTS NEEDED ON LARGE PIPE ONLY



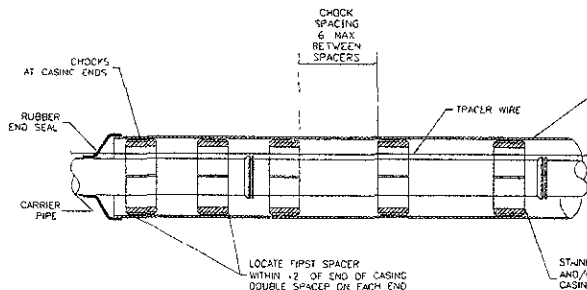
SECTION



SECTION A-A

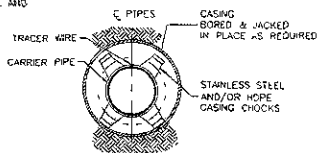
CONCRETE ENCASUREMENT

NT 5



PLAN VIEW

CASING BORED & JACKED IN PLACE AS REQUIRED MATERIAL AND THICKNESS AS SHOWN ON PLANS AND IN SPECIFICATIONS



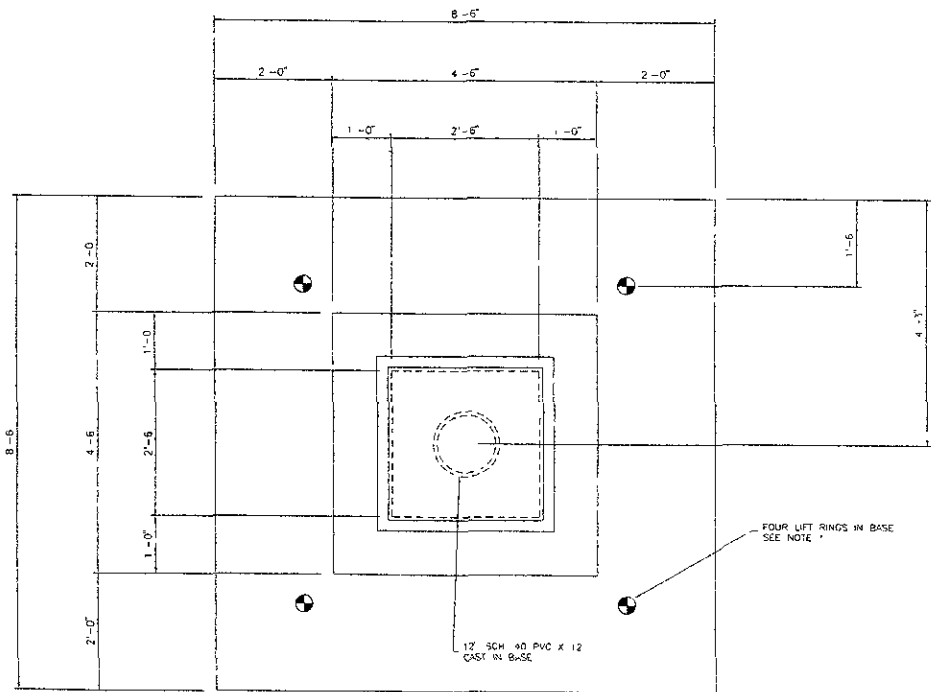
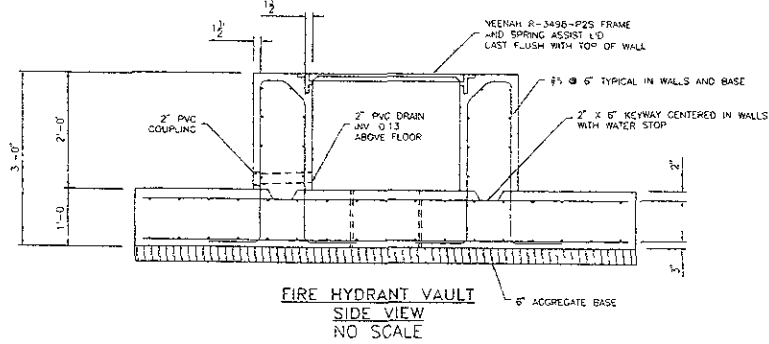
END VIEW

STEEL PIPE CASING

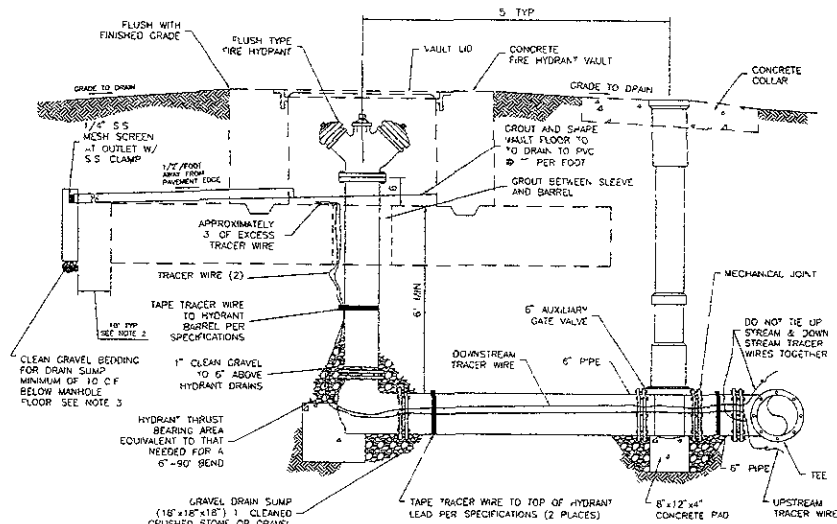
NT 5

PRELIMINARY

Rev'd	RAPID CITY REGIONAL AIRPORT	SHEET NO.
	RAPID CITY REGIONAL AIRPORT BOARD (OWNER)	7
	RAPID CITY, SOUTH DAKOTA	
Kadmas Lee & Jackson	WATER MAIN DETAILS	
Engineers, Surveyors and Planners	Scale: 1" = 10'	DATE: 03/20/2001
217 North W. 106th St., Cedar Rapids, IA 52403-1500	Phone: 319-241-1111	Fax: 319-241-1112



FIRE HYDRANT VAULT
SIDE VIEW
NO SCALE



FLUSH TYPE FIRE HYDRANT SETTING DETAIL
NO SCALE

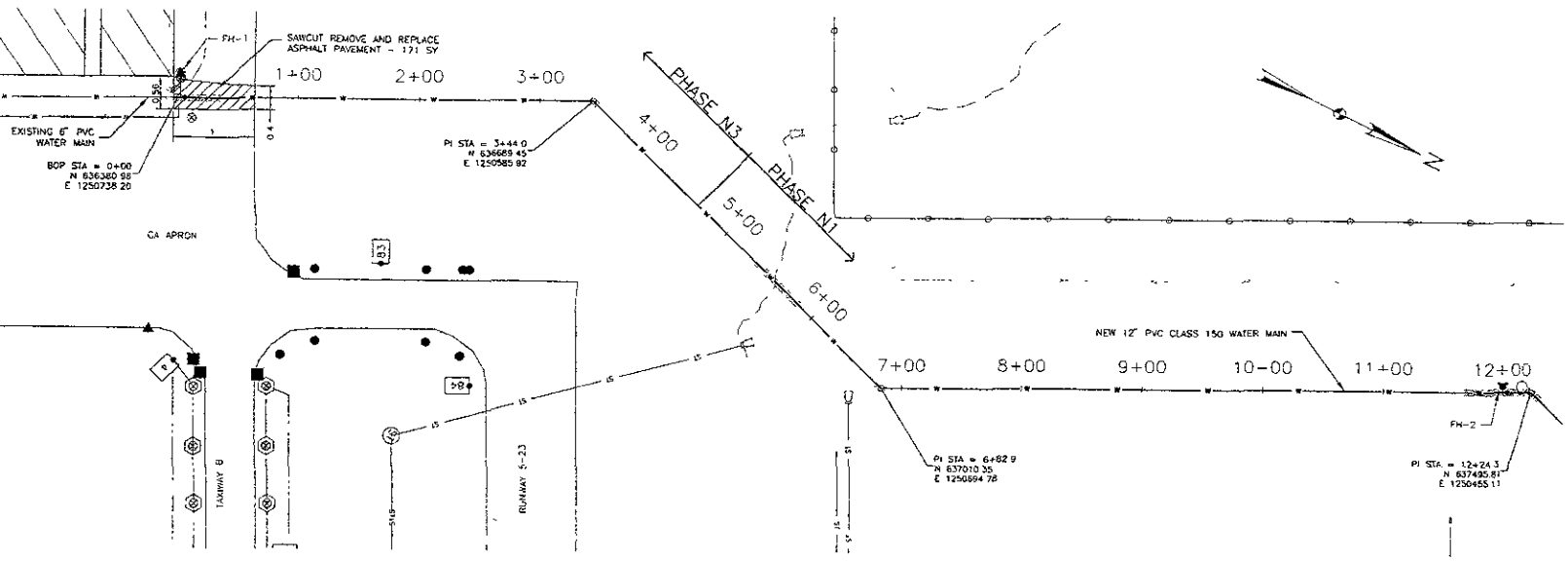
NOTES

- CONTRACTOR MAY PRE-CAST THE FIRE HYDRANT VAULTS
- DRAIN SUMP TO ONLY BE USED IN INSTALLATIONS WHERE GROUND WATER WILL NOT BE PRESENT IF GROUND WATER WILL BE PRESENT THEN OTHER ALTERNATIVES WILL NEED TO BE USED DRAIN SUMPS SHALL NOT BE USED IN FIRE HYDRANTS FH-2 AND FH-4 2" PVC PIPE SHALL BE DRAINED TO DAYLIGHT
- CONCRETE FOR FIRE HYDRANT VAULT SHALL MEET THE REQUIREMENTS OF SPECIFICATION R-610 AND HAVE A COMPRESSIVE STRENGTH OF 4 000 PSI

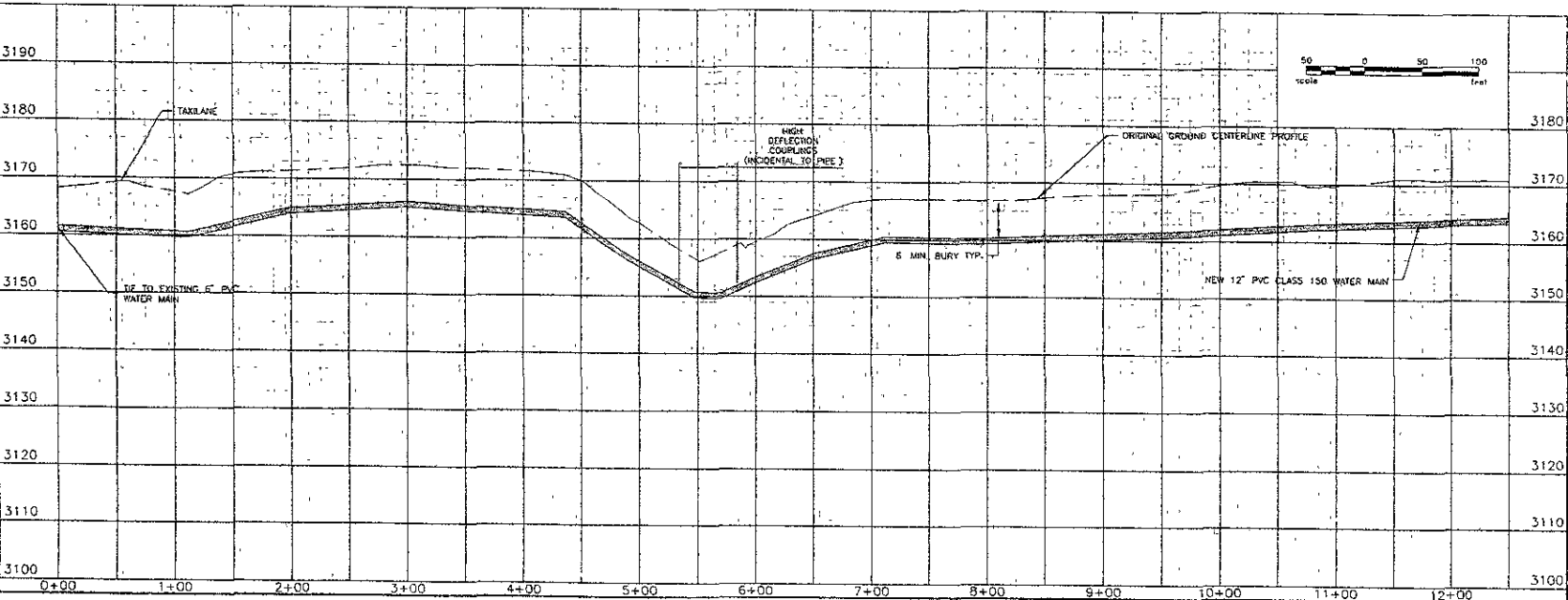
PRELIMINARY

Revised	RAPID CITY REGIONAL AIRPORT	SHEET NO
	RAPID CITY REGIONAL AIRPORT BOARD (OWNER)	8
	RAPID CITY SOUTH DAKOTA	
Kadmas Lee & Jackson		WATER MAIN DETAILS
Engineers, Surveyors and Planners	DATE OF PLAN	DATE OF REVISION
	10/20/10K	03/20/2010

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.



- REMOVE AND DISPOSE OF FIRE HYDRANT, AUX VALVE & VALVE BOX AND 16 LF 6" HYDRANT LEAD STA 0+03, 21' LT (INCIDENTAL INCIDENTAL)
- CONNECT TO EXISTING 6" PVC WATERMAIN STA 0+00 CL - 1 EA.
- INSTALL 12" x 6" REDUCER STA 0+03 CL - 1 EA.
- INSTALL 12" x 12" x 6" TEE STA 0+03 CL - 1 EA. STA 12+00 CL - 1 EA.
- INSTALL 12" WATER MAIN STA 0+00 TO STA 12+50 - 1250 LF.
- INSTALL 12" GATE VALVE AND VALVE BOX STA 0+05 CL - 1 EA. STA 12+00 CL - 1 EA.
- INSTALL FIRE HYDRANT, AUX. VALVE & VALVE BOX STA 0+03, 21' LT - 1 EA. STA 12+00, 5' LT - 1 EA.
- INSTALL 6" PVC PIPE STA 0+03, 21' LT - 16 LF. STA 12+00, 5' LT - 25 LF.
- INSTALL 12" 45 DEG BEND STA 3+44.0 CL - 1 EA. STA 6+82.9 CL - 1 EA. STA 12+24.3 CL - 1 EA.
- INSTALL CHECK DAMS STA 4+50 CL - 1 EA. STA 8+50 CL - 1 EA. STA 12+50 CL - 1 EA.
- INSTALL RESTRAINED HIGH DEFLECTION COUPLINGS STA 5+35 TO 5+85, CL - 50.0 LF (INCIDENTAL TO UNIT BID PRICE FOR 12" WATER MAIN)



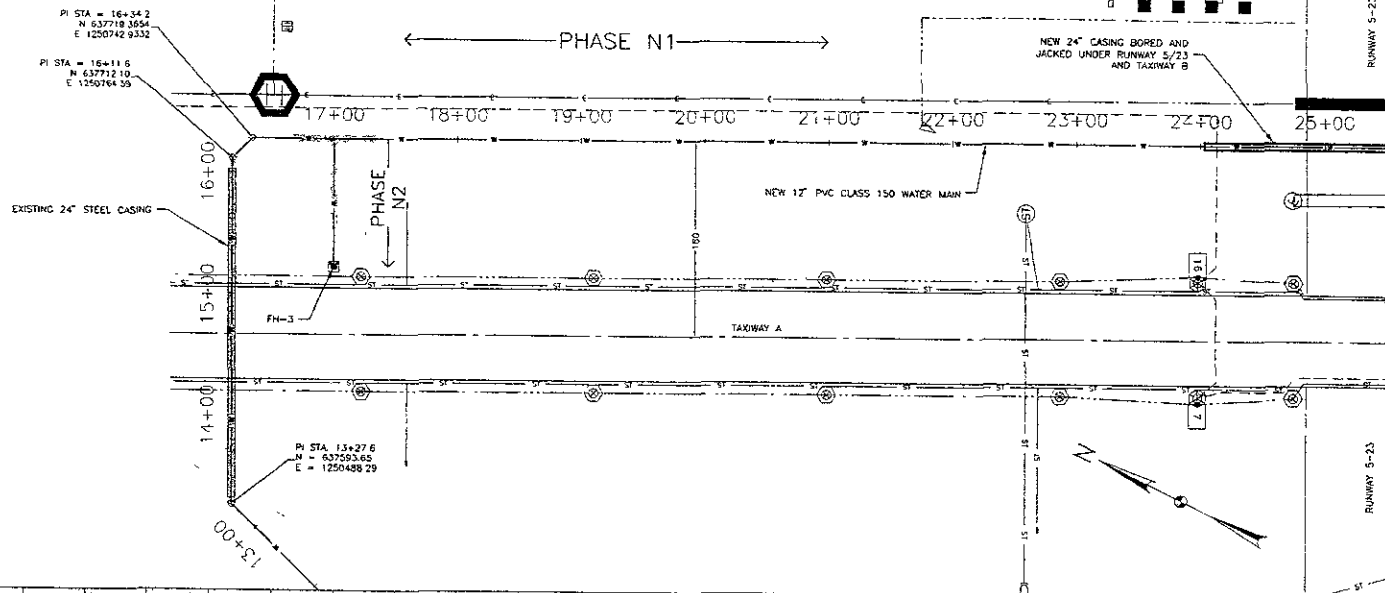
LEGEND

THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 1)

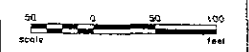
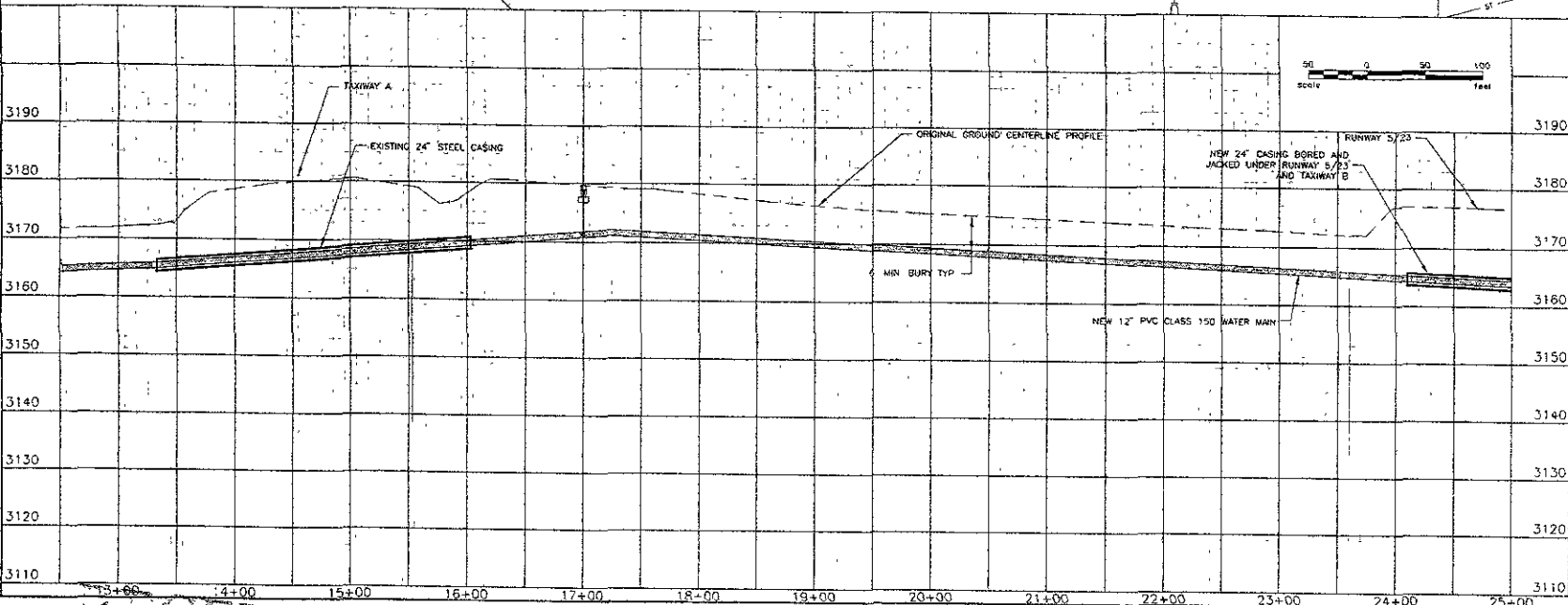
PRELIMINARY

Rapid City Regional Airport Rapid City Regional Airport Board (Owner) Rapid City, South Dakota		Sheet No. 9
Kadmas Lee & Jackson Engineers, Surveyors and Planners		WATER MAIN PLAN & PROFILE STA 0+00 TO 12+50
Drawn by 10/04/14	Checked by 10/07/14	Scale 1" = 10'

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.



- INSTALL 12" WATER MAIN
STA 12+50 TO STA 28+00 - 1250 L.F.
(INSTALL 12" RESTRAINED JOINT PVC FOR THE FULL LENGTH OF ALL CASINGS)
- INSTALL 12" 45 DEG BEND
STA 13+27.6, CL - 1 EA
STA 18+11.6, CL - 1 EA
STA 16+34.2, CL - 1 EA
- INSTALL CHECK DAMS
STA 16+50 CL - 1 EA
STA 20+50 CL - 1 EA
STA 23+50 CL - 1 EA
- INSTALL 12" GATE VALVE AND VALVE BOX
STA 16+98 CL - 1 EA
- INSTALL 12" 12" x 6" TEE
STA 17+00 CL - 1 EA
- INSTALL 6" PVC PIPE
STA 17+00 CL TO 1044.5' RT - 104.5 L.F.
- INSTALL FLUSH TYPE FIRE HYDRANT
AUX. VALVE & VALVE BOX
17+00, 104.5' RT - 1 EA
- INSTALL FIRE HYDRANT VAULT
STA 17+00, 104.5' RT - 1 EA
- INSTALL RESTRAINED HIGH DEFLECTION COUPLINGS
STA 17+00, 23" TO 73" RT - 50.0 L.F.
(INCIDENTAL TO UNIT BID PRICE FOR 12" WATER MAIN)
- BORE AND JACK 24" STEEL CASING
STA 24+10 TO STA 25+00 CL - 80 L.F.



LEGEND
THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 7)

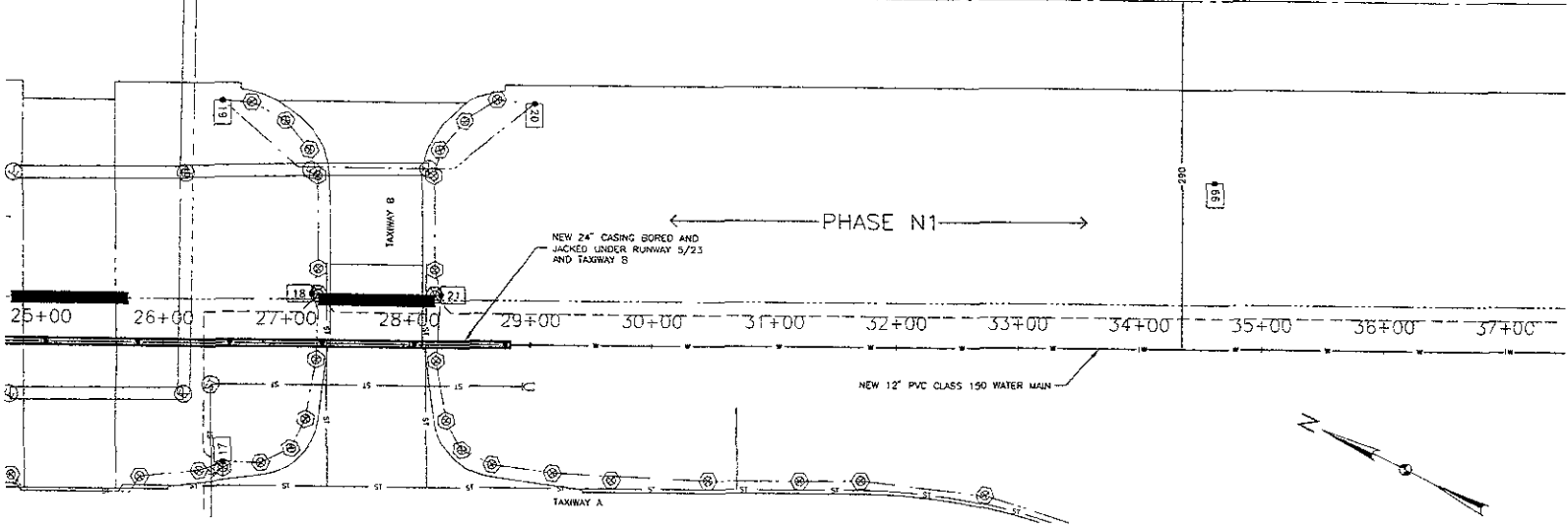
PRELIMINARY

Revised
RAPID CITY REGIONAL AIRPORT
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
RAPID CITY SOUTH DAKOTA
SHEET NO 10

Kadmas Lee & Jackson <small>Engineers, Surveyors and Planners</small>	WATER MAIN PLAN & PROFILE STA 12+50 TO 25+00	
	<small>DESIGNED BY</small> 15/DM	<small>CHECKED BY</small> 10/DF/2007
<small>PROJECT NO. 105671063 (2007) WATER MAIN AND GAS</small> DATED: 5/28/2007 9:40am © Kadmas, Lee & Jackson 2007		

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

RUNWAY 14-32

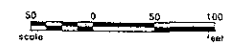
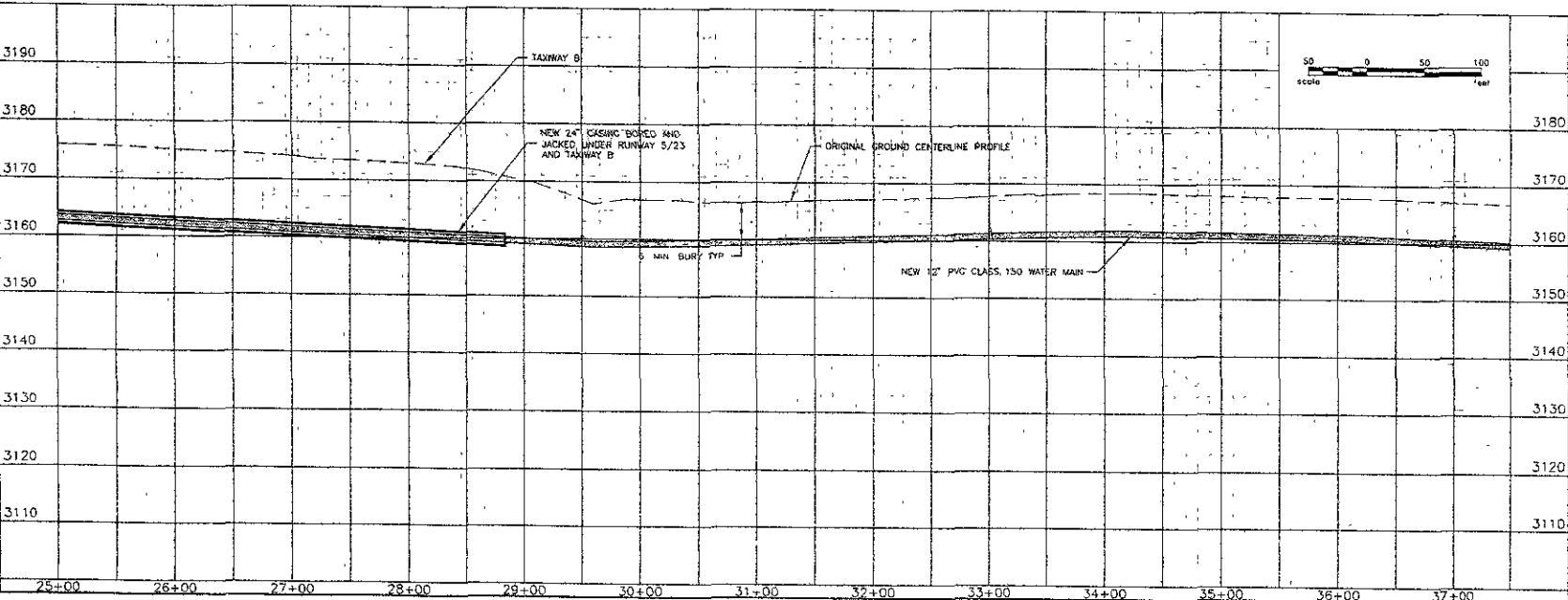


BORE AND JACK 24" STEEL CASING
STA 25+00 TO STA 28+83 CL - 383 LF

INSTALL 12" WATER MAIN
STA 25+00 TO STA 37+50 - 1250 LF
(INSTALL 12" RESTRAINED JOINT PVC FOR THE FULL LENGTH OF ALL CASINGS)

INSTALL 12" GATE VALVE AND VALVE BOX
STA 29+00 CL - 1 EA.

INSTALL CHECK DAMS
STA 28+50 CL - 1 EA.
STA 33+00 CL - 1 EA.
STA 37+00 CL - 1 EA.



LEGEND

THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 7)

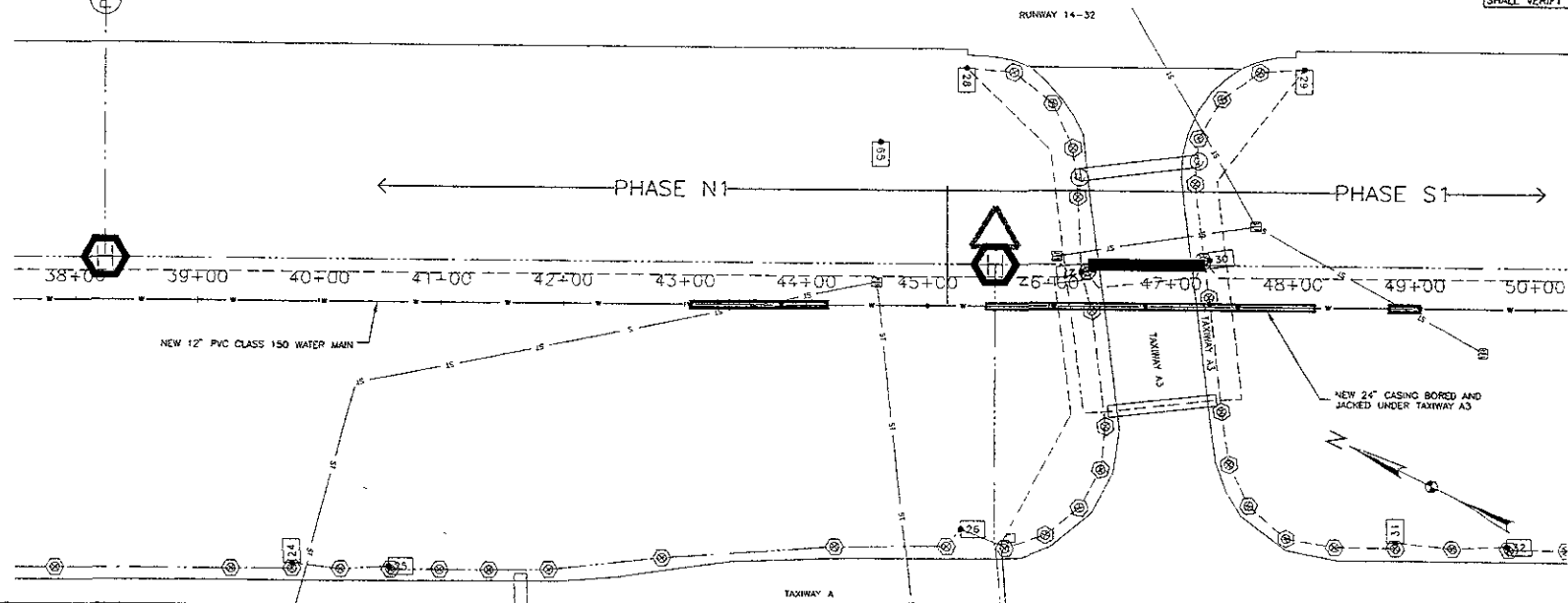
PRELIMINARY

Rev. 5
RAPID CITY REGIONAL AIRPORT
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
RAPID CITY SOUTH QUAD

Kadmas Lee & Jackson
Engineers, Surveyors and Planners
WATER MAIN PLAN & PROFILE
STA 25+00 TO 37+50

DATE: 10/2/04
DRAWN BY: [blank]
CHECKED BY: [blank]
DATE: 10/2/2007

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.



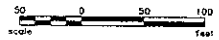
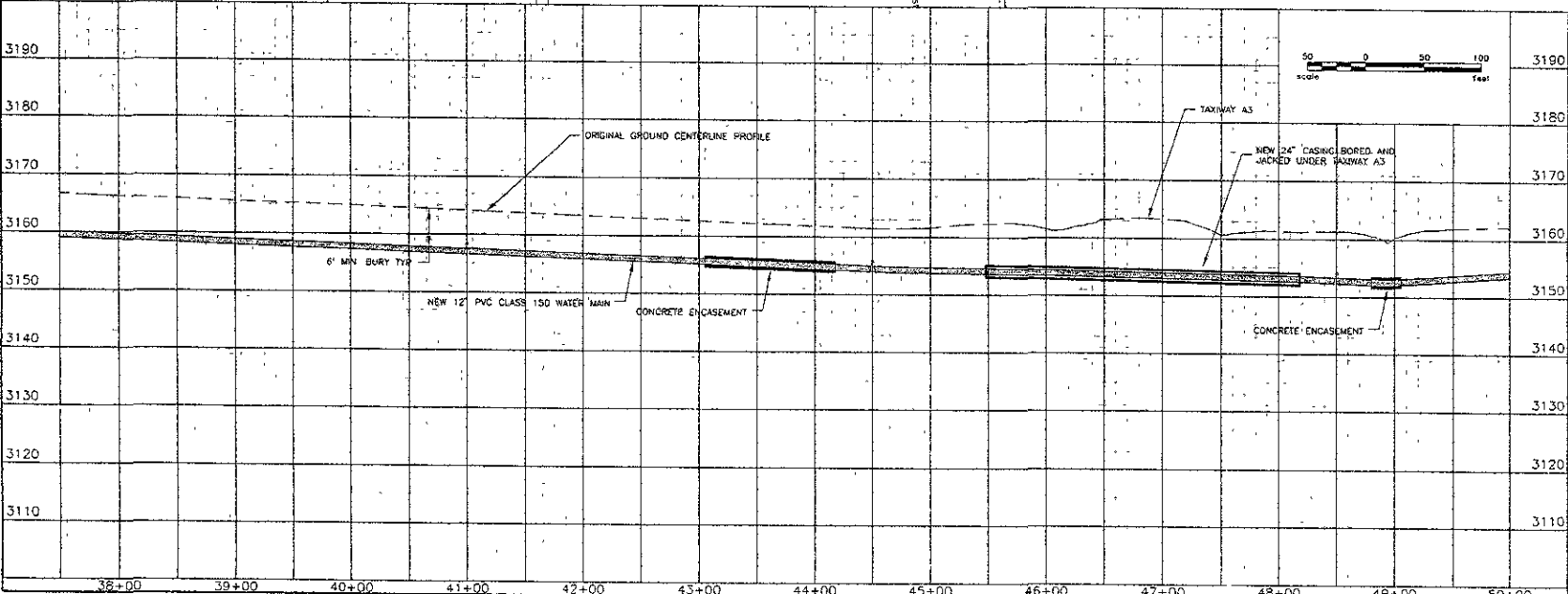
INSTALL 12" WATER MAIN
 STA 37+50 TO STA 50+00 - 1250 L.F.
 (INSTALL 12" RESTRAINED JOINT PVC FOR THE FULL LENGTH OF ALL CASINGS)

INSTALL CHECK DAMS
 STA 41+50, CL - 1 EA
 STA 44+50, CL - 1 EA
 STA 48+50, CL - 1 EA

INSTALL 12" GATE VALVE AND VALVE BOX
 STA 45+00 CL - 1 EA

CONCRETE ENCASED WATER MAIN
 STA 43+05 TO STA 44+18 - 113 L.F.
 STA 48+80 TO STA 49+05 - 25 L.F.

BORR AND JACK 24" STEEL CASING
 STA 45+48 TO STA 48+18 CL - 270 L.F.



LEGEND

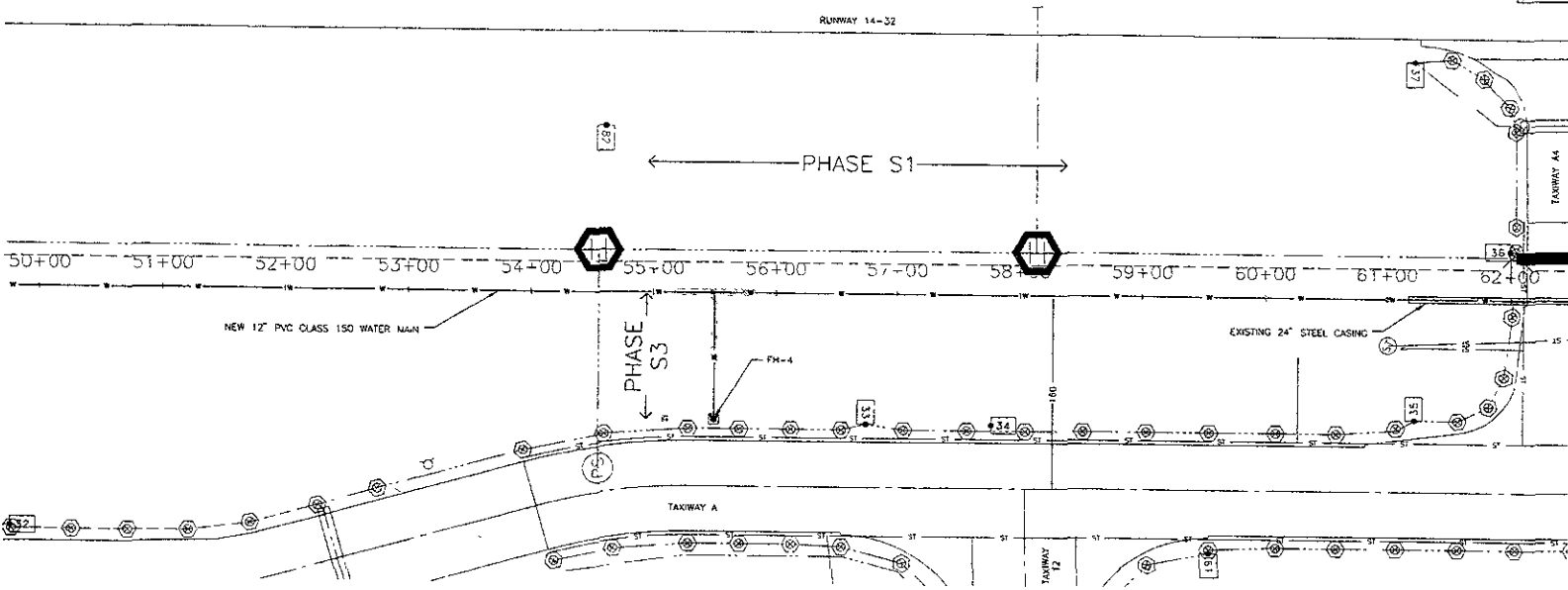
THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 7)

PRELIMINARY

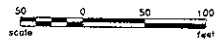
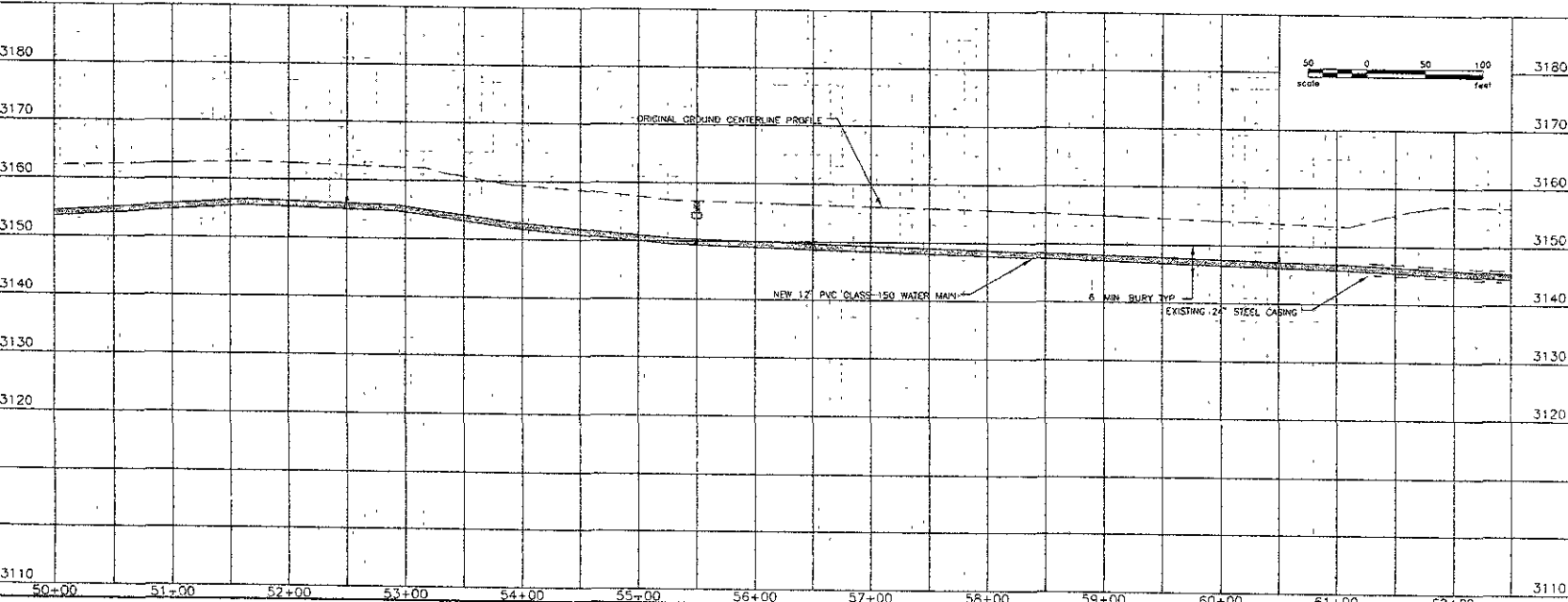
Revised: RAPID CITY REGIONAL AIRPORT
 RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
 RAPID CITY, SOUTH DAKOTA

Kadmas Lee & Jackson Engineers, Surveyors and Planners <small>Support: 1.800.710.0400; www.kadmaslee.com; info@klj.com</small>	Drawn by: TC/ELK Checked by:	Project No: 10527105 Date: 03/17/2007	Sheet No: 12 Title: WATER MAIN PLAN & PROFILE STA. 37+50 TO 50+00
	Scale:		

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.



- INSTALL 12" WATER MAIN
STA 50+00 TO STA 62+50 - 1250 L.F.
(INSTALL 12" RESTRAINED JOINT PVC FOR THE FULL LENGTH OF ALL CASINGS)
- INSTALL CHECK DAMS
STA 52+50, CL - 1 EA.
STA 55+50, 20' RT - 1 EA.
STA 56+50, CL - 1 EA.
STA 60+50, CL - 1 EA
- INSTALL 12" x 12" x 6" TEE
STA 55+50, CL - 1 EA
- INSTALL 6" PVC PIPE
STA 55+50, CL TO 104'5" RT - 104.5 L.F.
- INSTALL FLUSH TYPE FIRE HYDRANT VALVE & VALVE BOX
STA 55+50, 104'5" RT - 1 EA.
- INSTALL FIRE HYDRANT VAULT
STA 55+50 104'5" RT - 1 EA.
- INSTALL RESTRAINED HIGH DEFECTION COUPLINGS
STA 55+50, 7' TO 57' RT - 50.0 L.F.
(INCIDENTAL TO UNIT BID PRICE FOR 12" WATER MAIN)
- INSTALL GATE VALVE AND BOX
STA 54+48 CL - 1 EA.
STA 61+00 CL - 1 EA.



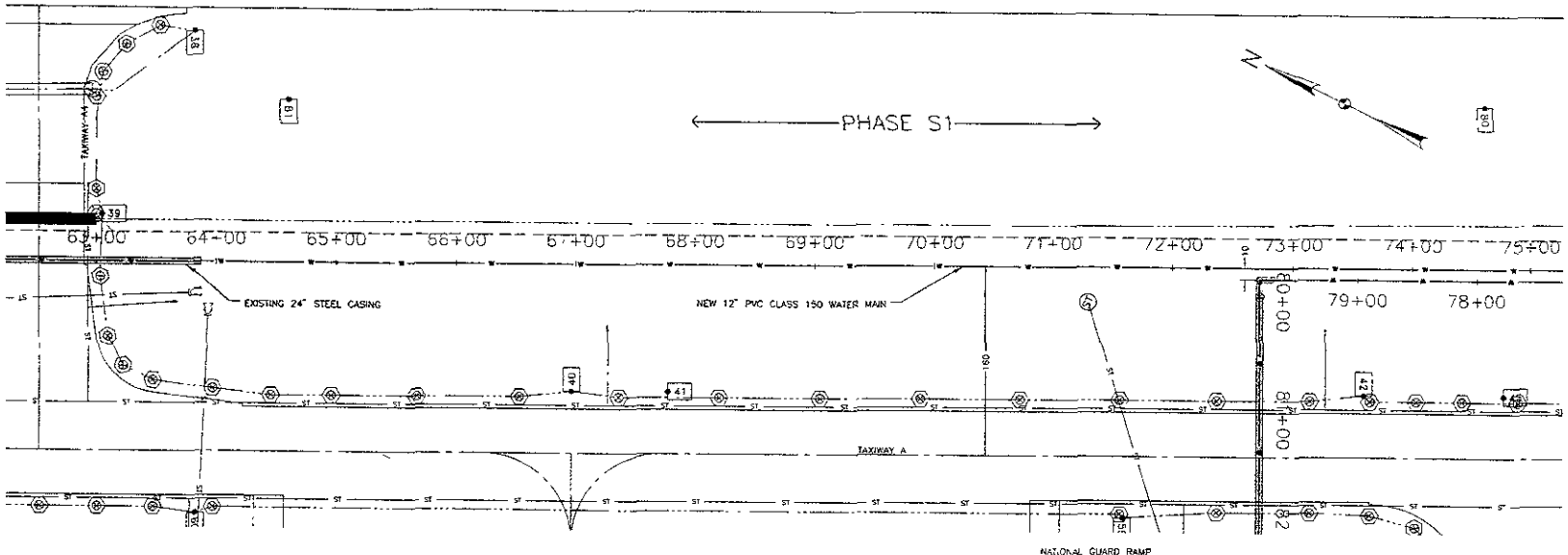
LEGEND
 THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 7)

PRELIMINARY

Revised: RAPID CITY REGIONAL AIRPORT
 RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
 RAPID CITY, SOUTH DAKOTA. SHEET NO. 13

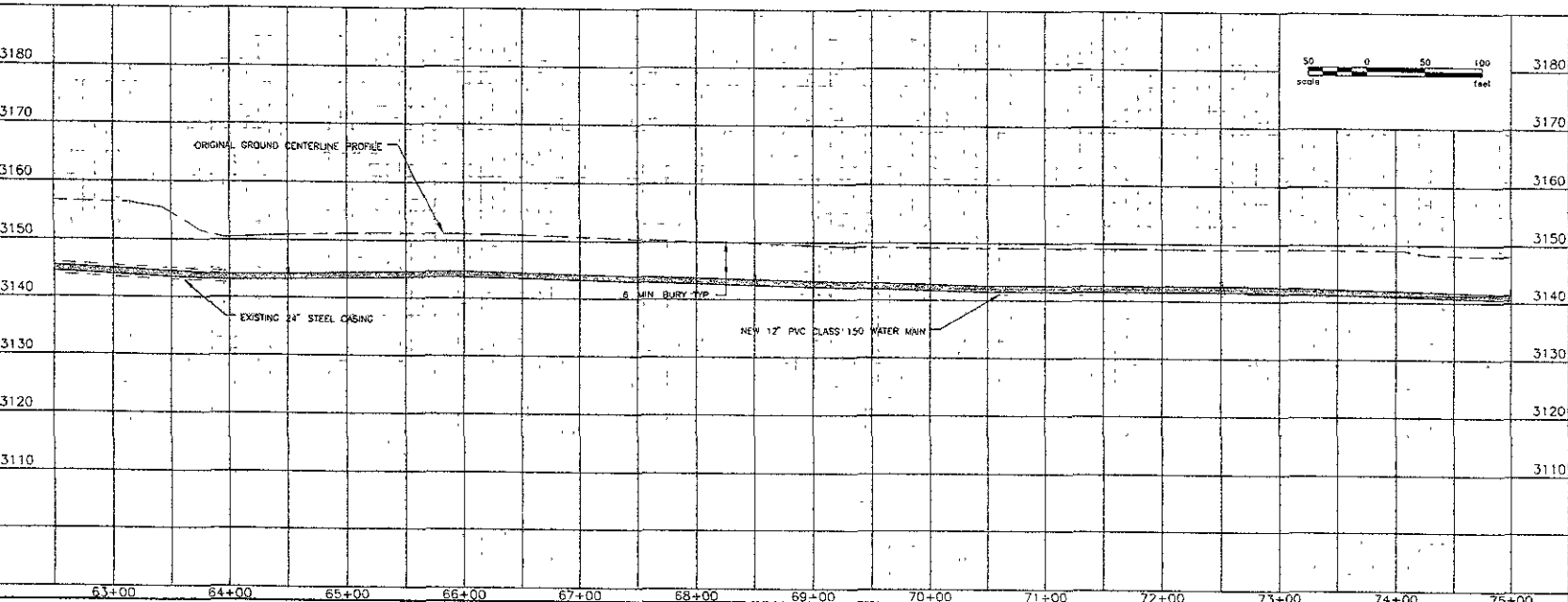
Kadmas Lee & Jackson
 ENGINEERS, ARCHITECTS AND PLANNERS
 WATER MAIN PLAN & PROFILE
 STA. 50+00 TO 62+50
 PROJECT NO. 10507106 DRAWING NO. 05/17/2007
 DATE: 05/17/2007

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION



INSTALL 12" WATER MAIN
 STA 62+50 TO STA 75+00 - 1250 L.F.
 (INSTALL 12" RESTRAINED JOINT PVC
 FOR THE FULL LENGTH OF ALL CASINGS)

INSTALL CHECK DAMS
 STA 64+50 CL - 1 EA.
 STA 68+50 CL - 1 EA.
 STA 72+50 CL - 1 EA.



LEGEND

THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 7)

PRELIMINARY

Rev. 0

RAPID CITY REGIONAL AIRPORT
 RAPID CITY REGIONAL AIRPORT BOARD (OWNER)
 RAPID CITY SOUTH DAKOTA

SHEET NO. 14

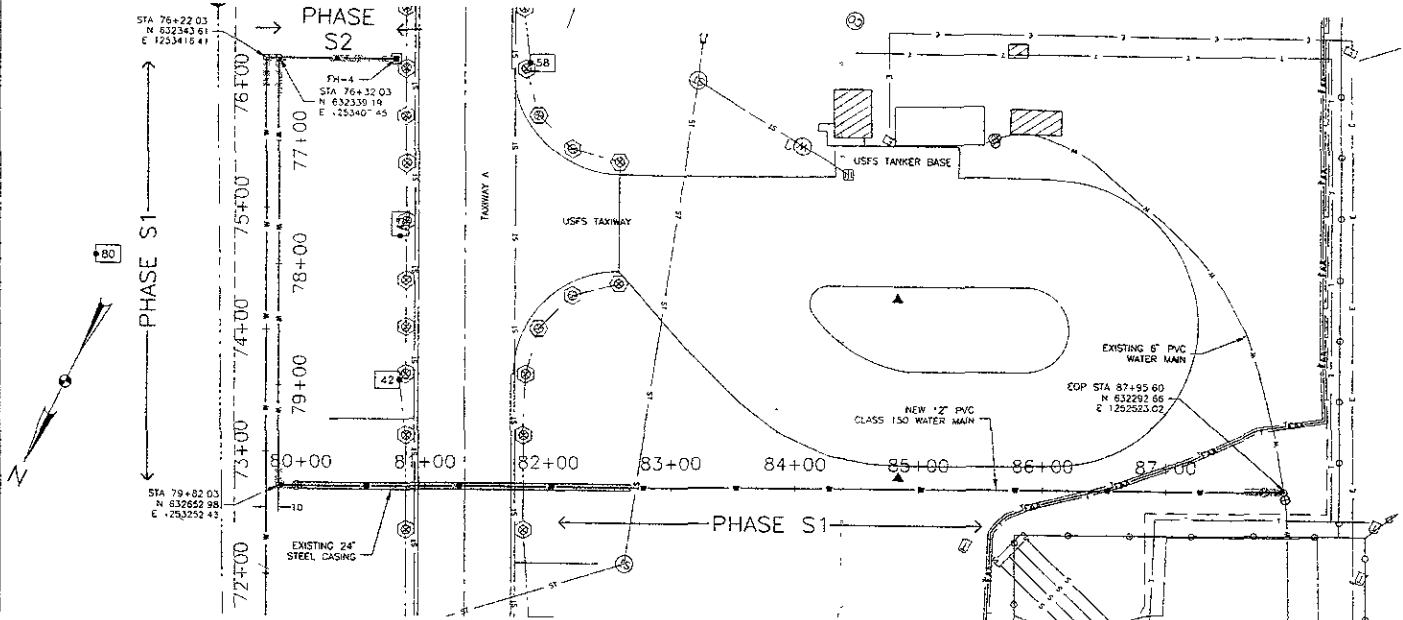
Kadmas
 Lee &
 Jackson

Engineers, Surveyors
 and Planners

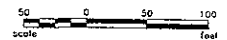
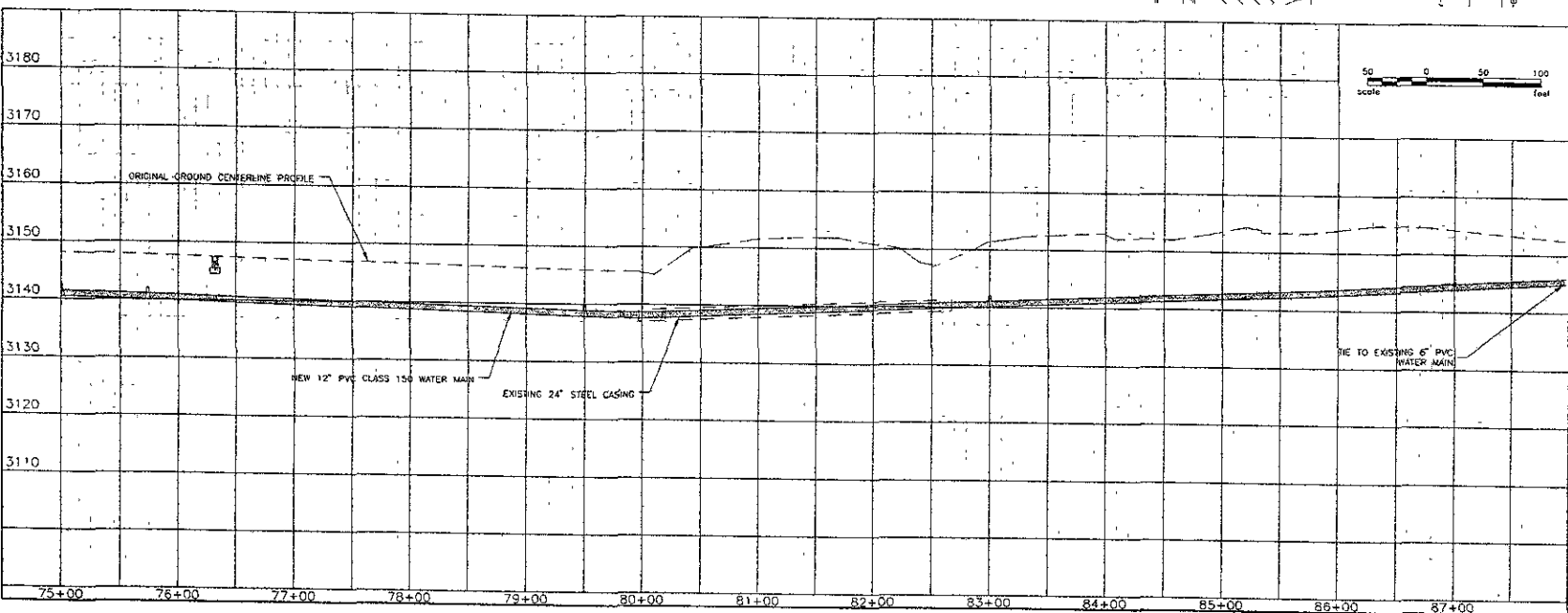
WATER MAIN
 PLAN & PROFILE
 STA. 62+50 TO 75+00

DATE: 10/2/14
 DRAWN BY: 10007106
 CHECKED BY: 10007106
 DATE: 03/17/2015

RUNWAY 14-32



- NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
- INSTALL 12" WATER MAIN
STA 75+00 TO STA 87+95 - 1295 L.F.
(INSTALL 12" RESTRAINED JOINT PVC FOR THE FULL LENGTH OF ALL CASINGS)
 - INSTALL CHECK DAMS
STA 76+00, CL - 1 EA.
STA 76+94, CL - 1 EA.
STA 79+50, CL - 1 EA.
STA 83+00, CL - 1 EA.
STA 87+00, CL - 1 EA.
 - INSTALL 12" 90 DEG BEND
STA 75+22.03, CL - 1 EA.
STA 77+82.03, CL - 1 EA.
 - INSTALL 12" X 12" XIE TEE
STA 75+32.03, CL - 1 EA.
 - INSTALL 6" PVC PIPE
STA 75+32.03, CL TO 94.5' RT - 94.5 L.F.
 - INSTALL FLUSH TYPE FIRE HYDRANT, AUX VALVE & VALVE BOX
STA 75+32.03, 94.5' RT - 1 EA.
 - INSTALL FIRE HYDRANT VAULT
STA 75+32.03, 94.5' RT - 1 EA.
 - INSTALL RESTRAINED HIGH DEFLECTION COUPLINGS
STA 75+32.03, 40' TO 90' RT - 50.0 L.F.
(INCIDENTAL TO UNIT BID PRICE FOR 12" WATER MAIN)
 - INSTALL 12" GATE VALVE AND VALVE BOX
STA 85+91, CL - 1 EA.
 - INSTALL 6" REDUCER
STA 85+93.60, CL - 1 EA.
 - INSTALL 6" X 6" XIE TEE
STA 87+97.6, CL - 1 EA.



LEGEND
THRUST BLOCKING AND RESTRAINED JOINTS (SHEET 7)

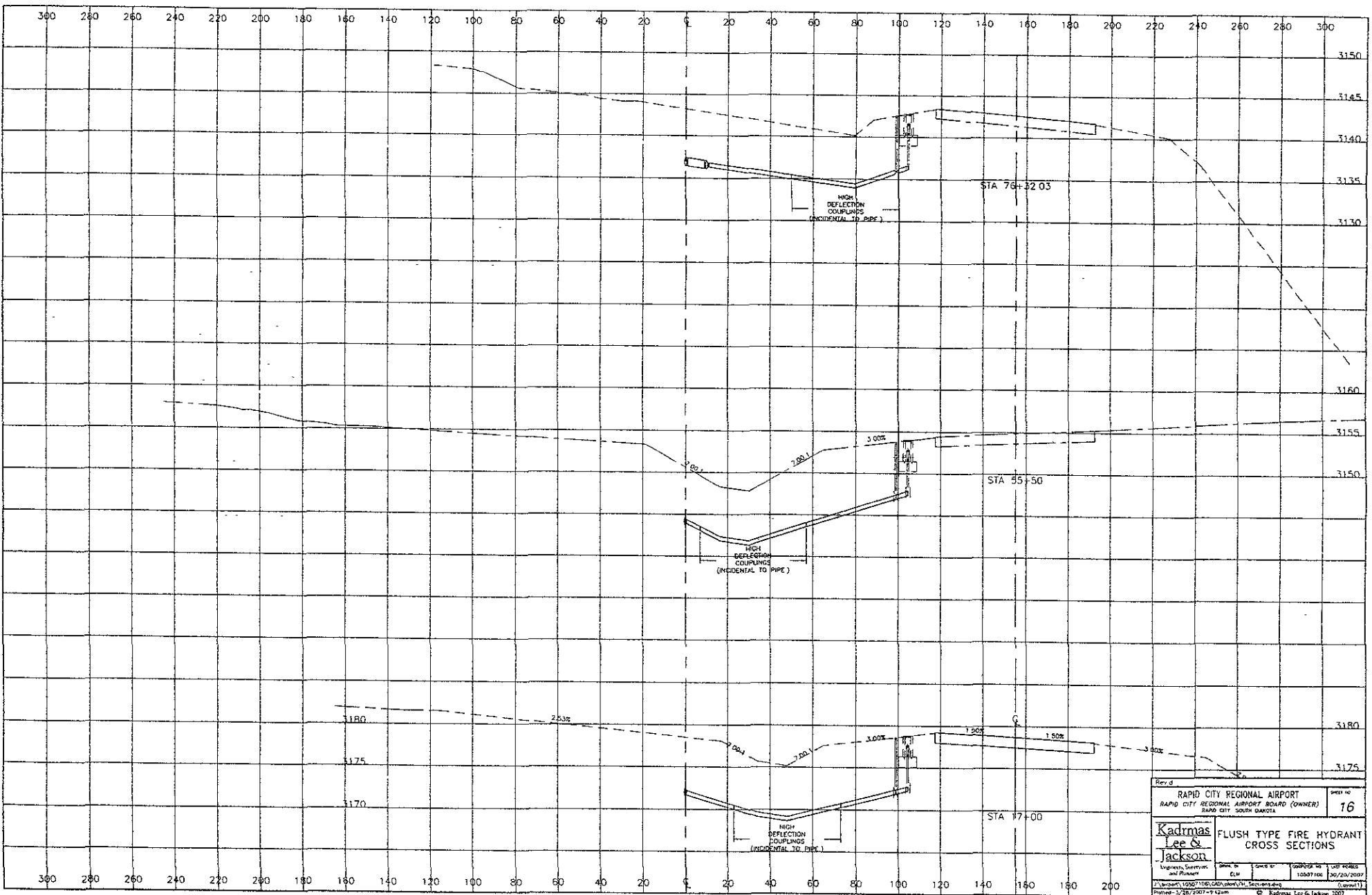
PRELIMINARY

Rev. 0	DATE
RAPID CITY REGIONAL AIRPORT	15
RAPID CITY REGIONAL AIRPORT BOARD (OWNER)	
RAPID CITY SOUTH DAKOTA	

Kadmas Lee & Jackson
Engineers, Surveyors and Planners

WATER MAIN
PLAN & PROFILE
STA. 75+00 TO 88+00

DATE: 10/17/2007
SCALE: AS SHOWN
PROJECT: 1121781-2-2007



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APR 02 2007

Rapid City Growth
Management Department

Rev. d RAPID CITY REGIONAL AIRPORT RAPID CITY REGIONAL AIRPORT BOARD (OWNER) RAPID CITY SOUTH DAKOTA		SHEET NO 16
Kadmas Lee & Jackson Engineers, Surveyors and Planners 1500 S. VANDERBILT RICHMOND, SD 57101 PHONE: 605/342-2500 FAX: 605/342-2501	FLUSH TYPE FIRE HYDRANT CROSS SECTIONS	
DRAWN BY ELM	CHECKED BY 10307 HOG	DATE 30/20/2007