UPPER BLACKSTONE WATER POLLUTION ABATEMENT DISTRICT

WASTEWATER TREATMENT FACILITY IMPROVEMENTS PHASE II

CONTRACT NO. UB 3 - 0 - 17512 - 0023

PROJECT NO. CWSRF - 2880

BOARD OF DIRECTORS

ROBERT L. MOYLAN JR, CHAIRMAN

J. BRADFORD LANGE, VICE CHAIRMAN

MATTHEW J. LABOVITES, SECRETARY

ENGINEER DIRECTOR / TREASURER

THOMAS K. WALSH, P.E.

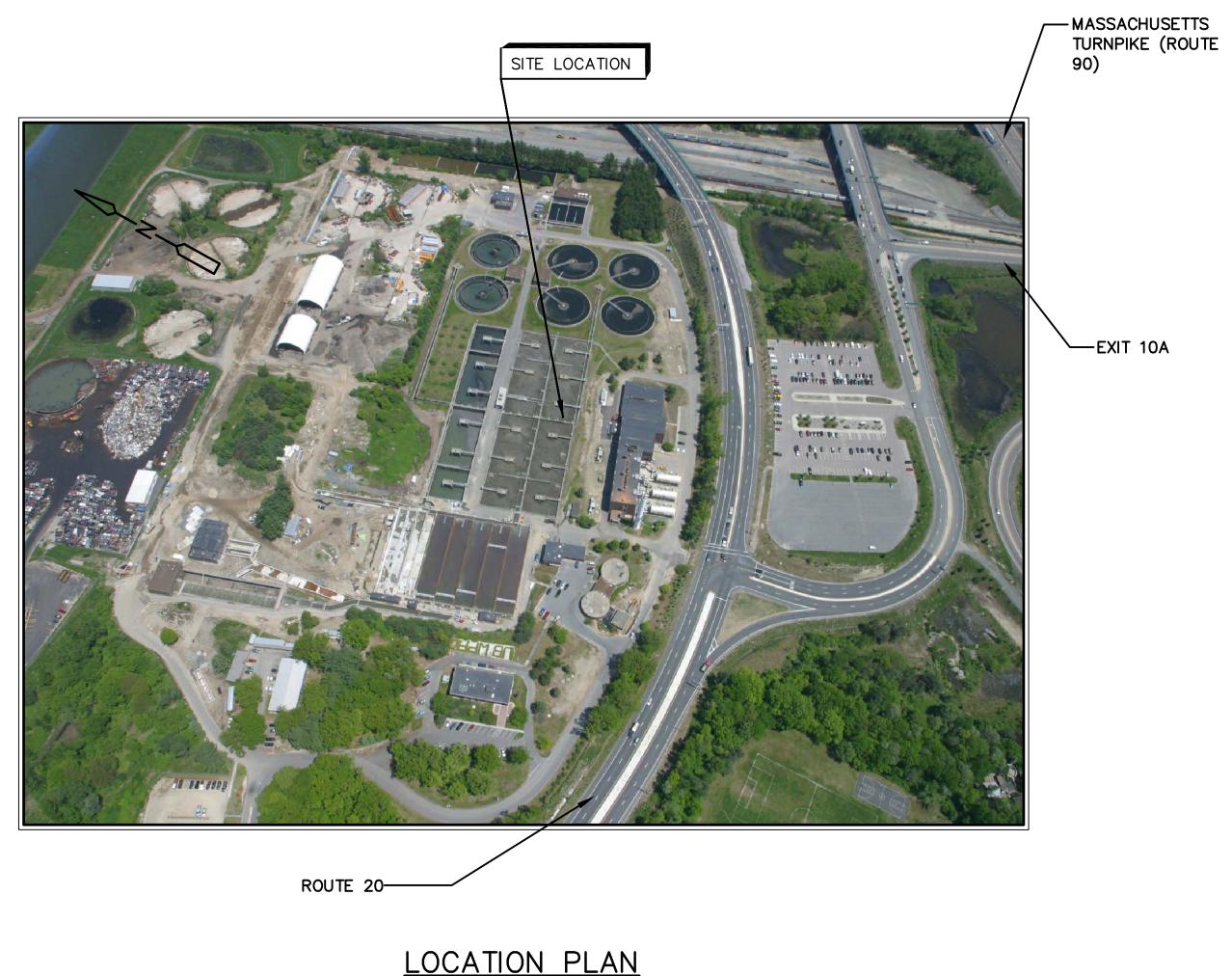
PLANT MANAGER

PAUL CARON

DISTRICT ENGINEER

KARLA SANGREY, P.E.

RECORD DRAWING NOVEMBER 2009



UNOFFICIAL CONFORMED CONTRACT DRAWINGS ARE FOR USE BY
THE UPPER BLACKSTONE WASTEWATER TREATMENT FACILITY
CONSTRUCTION MANAGEMENT STAFF ONLY AND ARE PROVIDED

SOLELY FOR INFORMATION

CDM Camp Dresser & McKee Inc. CAMBRIDGE, MASSACHUSETTS

APPROXIMATE SCALE: 1"=250"

Consulting Engineering Construction

1289-696

INDEX SHEET

<u>GENERAL</u>		<u>ARCHITECTU</u>	AL CONTINUED		MECHANICAL COM	<u>NTINUED</u>	
2 GD-1	INDEX OF DRAWINGS I	63 SD-A-2	PLAN AND MISCELLANEOUS DETAILS	13	31 FT-M-1 EX	KISTING FINAL SETTLING TANKS 1,2,3 & 4 - DEMOLITION PLAN, SECTIONS & DETA	AILS
3 GD-2	INDEX OF DRAWINGS II	64 SD-A-3	SCHEDULES, DOOR, WINDOW AND LOUVER T	YPES 13	32 FT-M-2 NO	ORTH AND SOUTH DISTRIBUTION BOXES — DEMOLITION — PLANS AND SECTIONS	
4 GD-3	DESIGN CRITERIA — PHASE II	65 SD-A-4	DOOR, WINDOW AND LOUVER DETAILS I	13	33 FT-M-3 FIN	NAL SETTLING TANKS — PLAN AND SECTIONS	
5 GD-4	HYDRAULIC PROFILE — AT COMPLETION OF PHASE II	66 SD-A-5	DOOR, WINDOW AND LOUVER DETAILS II			NAL SETTLING TANKS — SECTIONS AND DETAILS	H
6 GD-5	LIQUID PROCESS FLOW DIAGRAM — PHASE II	67 SD-A-6	DOOR, WINDOW AND LOUVER DETAILS III			NAL SETTLING TANK DISTRIBUTION BOX — PLAN, SECTIONS & DETAILS	
OIV/II		STRUCTURAL				OUTH SLUDGE RECIRCULATION PUMP STATION — DEMOLITION — PLANS	
<u>CIVIL</u>		STRUCTURAL	=	13		OUTH SLUDGE RECIRCULATION PUMP STATION — DEMOLITION — PLANS AND SECTIONS	
7 C-1	CIVIL/SITE LEGEND, NOTES AND ABBREVIATIONS	68 PT-S-1	PRIMARY SETTLING TANK CHANNEL - EPOX	Y LINING PLAN AND SECTIONS		DRTH SLUDGE RECIRCULATION PUMP STATION — DEMOLITION — PLANS	
8 C-2	OVERVIEW PLAN	69 AT-S-1	AERATION TANKS — DEMOLITION PLAN I			ORTH SLUDGE RECIRCULATION PUMP STATION — DEMOLITION — PLANS	
9 C-3	BORING PLAN	70 AT-S-2	AERATION TANKS — DEMOLITION PLAN II AERATION TANKS — BASE PLAN I			AND SECTIONS	
10 C-4	EXISTING CONDITIONS AND SITE REMOVAL PLAN I	71 AT-S-3 72 AT-S-4	AERATION TANKS — BASE PLAN II	14	40 PS-M-5 SC	DUTH SLUDGE RECIRCULATION PUMP STATION — NEW WORK — PLANS I	
11 C-5	EXISTING CONDITIONS AND SITE REMOVAL PLAN II	73 AT-S-5	ADD ALTERNATE NO. 2 AERATION TANKS —	BASE PLAN III		OUTH SLUDGE RECIRCULATION PUMP STATION — NEW WORK — PLAN II	
12 C-6 13 C-7	EXISTING CONDITIONS AND SITE REMOVAL PLAN III EXISTING CONDITIONS AND SITE REMOVAL PLAN IV	74 AT-S-6	AERATION TANKS — TOP PLAN I			AND SECTIONS	
13 C-7 14 C-8	LAYOUT, GRADING AND EROSION CONTROL PLAN I	75 AT-S-7	AERATION TANKS — TOP PLAN II			DUTH SLUDGE RECIRCULATION PUMP STATION — NEW WORK — SECTIONS DRTH SLUDGE RECIRCULATION PUMP STATION — NEW WORK — PLANS I	
15 C-9	LAYOUT, GRADING AND EROSION CONTROL PLAN II	76 AT-S-8	ADD ALTERNATE NO. 2 AERATION TANKS —			LUDGE PROCESSING COMPLEX — DEMOLITION — PLAN AND SECTIONS	Γ
16 C-10	LAYOUT, GRADING AND EROSION CONTROL PLAN III	77 AT-S-9	AERATION TANKS — ENLARGED PLANS I	14		LUDGE PROCESSING COMPLEX - NEW WORK - PLAN AND SECTIONS	
17 C-11	LAYOUT, GRADING AND EROSION CONTROL PLAN IV	78 AT-S-10 79 AT-S-11	AERATION TANKS — CONCRETE SECTIONS & AERATION TANKS — CONCRETE SECTIONS &	14	46 SP-M-3 SL	LUDGE PROCESSING COMPLEX — NEW WORK AND DEMOLITION — PLAN AND SECTION	ONS
18 C-12	ENLARGED LANDSCAPING PLAN I	80 AT-S-12	AERATION TANKS — CONCRETE SECTIONS & AERATION TANKS — CONCRETE SECTIONS &	DETAILS III		LUDGE PROCESSING COMPLEX — NEW WORK AND DEMOLITION — PLAN AND SECTION.	ONS II
19 C-13 20 C-14	AERATION CONTROL FACILITY — DEMOLITION—PLAN, SECTION AND DETAILS OVERALL YARD PIPING PLAN	81 AT-S-13	AERATION TANKS — CONCRETE SECTIONS &	DETAILS IV		ECHANICAL DETAILS I	
20 C 14 21 C-15	ENLARGED YARD PIPING PLAN I	82 AT-S-14	AERATION TANKS - CONCRETE SECTIONS &	DETAILS V		ECHANICAL DETAILS II ECHANICAL DETAILS III	
22 C-16	ENLARGED YARD PIPING PLAN II	83 AT-S-15	AERATION TANKS - CONCRETE SECTIONS &	DETAILS VI	49 3D-W-3 WI	ECHANICAL DETAILS III	
23 C-17	ENLARGED YARD PIPING PLAN III	84 AT-S-16	AERATION TANKS - CONCRETE SECTIONS &		<u>HVAC</u>		
24 C-18	ENLARGED YARD PIPING PLAN IV	85 AT-S-17	AERATION TANKS — CONCRETE SECTIONS &			/AC LECEND /CYMDOLC /ADDDEN/MICANO	l
25 C-19	AERATION TANKS UNDERDRAIN SYSTEM LAYOUT	86 AT-S-18	ADD ALTERNATE NO. 2 AERATION TANKS —			/AC LEGEND/SYMBOLS/ABBREVIATIONS OUTH SLUDGE RECIRC PUMP STATION — DEMOLITION PLANS AND SECTIONS	\vdash
26 C-20 27 C-21	ENLARGED PLAN AND SECTIONS SEWAGE PUMP STATION	87 AT-S-19 88 AT-S-20	AERATION TANKS — ENLARGED PLANS II AERATION TANKS — ENLARGED PLANS III			OUTH SLUDGE RECIRC PUMP STATION — DEMOLITION PLANS AND SECTIONS OUTH SLUDGE RECIRCULATION PUMP STATION NEW WORK—PLANS AND	
27 C-21 28 C-22	FINAL SETTLING TANK EFFLUENT PIPING PROFILE	89 AT-S-21	BLOWER, SUBSTATION & AIR PIPING — FOU			SECTIONS	
29 C-23	SITE DETAILS I	90 AT-S-22	BLOWER, SUBSTATION & AIR PIPING - SEC			ORTH SLUDGE RECIRC PUMP STATIONS — DEMOLITION PLANS AND	
30 C-24	SITE DETAILS II	90A AT-S-24	EXISTING WET WEATHER DISCHARGE CHANNE			SECTIONS	
31 C-25	CIVIL DETAILS I		PLAN, SECTIONS AND DETAILS			ORTH SLUDGE RECIRCULATION PUMP STATIOS —NEW WORK PLANS AND	
32 C-26 33 C-27	CIVIL DETAILS II ORIGINAL IMHOFF TANK DESIGN PLAN	90B AT-S-25	EXISTING WET WEATHER DISCHARGE CHANNE			SECTIONS	
34 C-28	ORIGINAL IMHOFF TANK DESIGN FLAN ORIGINAL IMHOFF TANK DESIGN SECTION		PLAN, SECTIONS AND DETAILS			LUDGE PROCESSING BUILDING—BASEMENT PLAN—MODIFICATIONS	
35 C-29	ASH LANDFILL CLOSURE EXISTING CONDITIONS PLAN	91 AT-S-23	AERATION TANKS — REPAIR PLAN, SECTIONS	3 & 5217,1123		.UDGE PROCESSING BUILDING BLDG-FIRST FLOOR PLAN-DEMOLITION PLAN & MODIFICATION PLAN	
36 C-30	ASH LANDFILL CLOSURE FINAL CONDITION PLAN	92 FT-S-1 93 FT-S-2	EXISTING FINAL SETTLING TANKS — BRACKET FINAL SETTLING TANKS — PLANS, SECTIONS			AINTENANCE BUILDING DEMOLITION PLANS	
37 C-31	ASH LANDFILL CLOSURE TYPICAL PROFILES	93 FT-3-2 94 FT-S-3	FINAL SETTLING TANKS — FLANS, SECTIONS & DETA	& DE174123		AINTENANCE BUILDING LOWER AND UPPER LEVEL—NEW WORK	
38 C-32	ASH LANDFILL CLOSURE MISC DETAILS I	95 FT-S-4	FINAL SETTLING TANKS — SECTIONS & DETA		59 MB-H-3 MA	AINTENANCE SUPPORT FACILITY -FLOOR PLAN & SECTIONS	
39 C-33	ASH LANDFILL CLOSURE MISC DETAILS II	96 FT-S-5	FINAL SETTLING TANKS DISTRIBUTION BOXES		SO SD-H-1 HV	/AC STANDARD DETAILS I	
40 SR-1	SITE REMEDIATION PLAN	97 FT-S-6	FINAL SETTLING TANKS DISTRIBUTION BOXES	020110110 00 02171120		AC STANDARD DETAIL II	
41 SR-2	SITE REMEDIATION PLAN - IMHOFF TANKS - ENLARGED PLAN	98 PS-S-1	EXISTING SLUDGE RECIRCULATION PUMPING	51/110115 1 B 110; 5E0110115 & BE1/11E0		DILER PIPING DIAGRAMS	
42 SR−3 43 SR−4	SITE REMEDIATION PLAN — IMHOFF TANKS — SECTION I SITE REMEDIATION PLAN — IMHOFF TANKS — SECTION II	99 SP-S-1	EXISTING SLUDGE PROCESSING COMPLEX -	TAITIAL DASLIMLINI I LAIN & SECTIONS		C DIAGRAM II	
44 SR-5	SITE REMEDIATION - PROPOSED CAPPING/DRAINAGE/GRADING PLAN	100 MB-S-1	PLAN & SECTIONS MAINTENANCE BUILDING — PLANS, SECTIONS		S4 SD-H-5 AT	C DIAGRAM II	
45 SR-6	SITE REMEDIATION- TWO-PHASE EXTRACTION SYSTEM PLANS AND DETAILS	100 MB-3-1 101 MB-S-2	MAINTENANCE BUILDING — PLANS, SECTIONS MAINTENANCE BUILDING — PLAN, SECTIONS		PLUMBING		
		102 MB-S-3	MAINTENANCE SUPPORT FACILITY - PLANS,		<u></u>		
		103 MB-S-4	MAINTENANCE SUPPORT FACILITY - SECTION		65 GD-P-1 PL	_UMBING-ABBREVIATIONS/SYMBOLS	_(
<u>ARCHITEC</u>	<u>TURAL</u>	104 YS-S-1	MISCELLANEOUS YARD STRUCTURES - PLAN	10 a 020110110		LUDGE RECIRCULATION PUMP STATIONS — PLANS	
46 GD-A-1	ABBREVIATIONS AND LEGEND	105 SD-S-1	STANDARD CONCRETE DETAILS I			LUDGE COMPLEX — BASEMENT PLAN	
47 GD-A-2		106 SD-S-2	STANDARD CONCRETE DETAILS II			LUDGE COMPLEX — FIRST FLOOR — PART PLANS AINTENANCE BUILDING — DEMOLITION PLANS	
48 PS-A-1	SLUDGE RECIRCULATING PUMP STATIONS (SOUTH AND NORTH) - DEMOLITION -	107 SD-S-3 108 SD-S-4	STANDARD CONCRETE MODIFICATION DETAILS STANDARD MISCELLANEOUS DETAILS I			AINTENANCE BUILDING - DEMOCITION FLANS AINTENANCE BUILDING - NEW WORK PLANS	
	PLANS AND ELEVATIONS	108 SD-S-5	STANDARD MISCELLANEOUS DETAILS II			AINTENANCE SUPPORT FACILITY — PLANS	
49 PS-A-2		110 SD-S-6	STANDARD CMU DETAILS			AINTENANCE SUPPORT FACILITY — RISER DIAGRAMS	
	AND ELEVATIONS	111 SD-S-7	CONCRETE BEAM AND COLUMN SCHEDULES	AND DETAILS 17	73 SD-P-1 PL	LUMBING — TYPICAL DETAILS	
50 SP-A-1	SLUDGE PROCESSING COMPLEX OPERATIONS — LOCKER/LUNCH FACILITIES —	MEGLIANICA					l
51 SP-A-2	DEMOLITION AND NEW — PARTIAL FLOOR PLANS SLUDGE PROCESSING COMPLEY OPERATIONS — LOCKER/LUNCH FACILITIES —	<u>MECHANICAL</u>	,				l
31 3M-A-Z	SLUDGE PROCESSING COMPLEX OPERATIONS — LOCKER/LUNCH FACILITIES — ELEVATIONS AND REFLECTED CEILING PLAN	112 GD-M-1	MECHANICAL SYMBOL LEGEND — ABBREVIATI				F
52 SP-A-3		113 PT-M-1	PRIMARY SETLING TANK EFFLUENT CHANNEL				l
53 SP-A-4	SLUDGE PROCESSING COMPLEX OPERATIONS — WALL SECTIONS AND PARTIAL WEST ELEVATIONS	114 AT-M-1 115 AT-M-2	EXISTING AERATION TANKS — DEMOLITION P EXISTING AERATION TANKS — DEMOLITION S				l
54 MB-A-1	MAINTENANCE BUILDING - DEMOLITION - FIRST FL, SECOND FL AND ROOF PLANS	115 AI-M-2 116 AT-M-3	AERATION TANKS NO. 1 & NO. 2 - LOWER				l
55 MB-A-2	MAINTENANCE BUILDING — DEMOLITION — EXTERIOR ELEVATIONS AND DETAILS	117 AT-M-4	AERATION TANKS NO. 3 & NO. 4 - LOWER				
56 MB-A-3	MAINTENANCE BUILDING — FIRST FL, SECOND FL, ROOF AND REFLECTED CEILING PLANS	118 AT-M-5	AERATION TANKS NO. 1 & NO. 2 - TOP P				l
57 MB-A-4	MAINTENANCE BUILDING — ELEVATIONS AND DETAILS MAINTENANCE SUPPORT FACILITY — FLOOR ROOF REFLECTED CELLING AND ENLARGED PLANS	119 AT-M-6	AERATION TANKS NO. 3 & NO. 4 - TOP P				l
58 MB-A-5 59 MB-A-6		120 AT-M-7	AERATION TANK NO. 5 - TOP AND LOWER	PLAN			l
60 MB-A-7	MAINTENANCE SUPPORT FACILITY — WALL SECTIONS	121 AT-M-8	AERATION TANKS — SECTIONS I				l
61 MB-A-8		122 AT-M-9 123 AT-M-10	AERATION TANKS — SECTIONS II AERATION TANKS — SECTIONS III				
62 SD-A-1		123 AT-M-10 124 AT-M-11	AERATION TANKS — SECTIONS III AERATION TANKS — PLANS, SECTIONS AND	DETAILS I			
		125 AT-M-12	AERATION TANKS — PLANS, SECTIONS AND				l
		126 AT-M-13	AERATION AND CHANNEL AIR BLOWERS — P				l
		127 AT-M-14	AERATION BLOWERS — SECTIONS AND DETAI				l
		128 AT-M-15	HYDRAULIC WASTING BOX AND CHANNEL AIR				l
		129 AT-M-16	DIFFUSER LAYOUT FOR AERATION TANK NO. PLAN AND DETAILS	I — ROLLOW			l
		130 AT-M-17	DIFFUSER LAYOUT FOR AERATION TANK NO.4	4 — BOTTOM			
			PLAN AND DETAILS	- ···		RECORD DRA	AWING
1/09	0000000					 	DDO ISOT 115
.,	CADD FILE NO. GGPNX002 DESIGNED BY: J. CROSS		CDM Camp Dresser & McKee Inc.	UPPER BLACKSTONE WATER POLLUTION ABATEMENT DIST	BICT		PROJECT NO. 1289\45571
	DESIGNED BI V. BITTO		consulting engineering consentrating	CONTRACT No. UB 3 - 0 - 17512 - 0023			·

1/07 VJB ZN REVISED PER ADDENDA NOS. 1 THROUGH 4

REMARKS

NOVEMBER 2006

Camp Dresser & McKee Inc.

WATER POLLUTION ABATEMENT DISTRICT CONTRACT No. UB 3 - 0 - 17512 - 0023

WASTEWATER TREATMENT FACILITY **IMPROVEMENTS - PHASE II**

INDEX OF DRAWINGS I

Sht. 2 of 276

GD-1

INDEX SHEET

<u>INSTRUMENTATION</u> <u>ELECTRICAL CONTINUED</u>

```
174 GD-I-1
               LEGEND SHEET I
                                                                                              244 AT-E-1
                                                                                                             EXISTING AERATION TANKS - DEMOLITION PLAN
              LEGEND SHEET II
175 GD-I-2
                                                                                              245 AT-E-2
                                                                                                             EXISTING AERATION TANKS — AERATOR CONTROL BUILDING DEMOLITION PLANS
176 GD-I-3
               CONTROL SYSTEM ARCHITECTURE
                                                                                              246 AT-E-3
                                                                                                             AERATION TANKS NO.1 & 2 - ELECTRICAL PLAN
177 GD-I-4
               VFD COMMUNICATION NETWORK LAYOUT
                                                                                              247 AT-E-4
                                                                                                             AERATION TANKS NO.3 & 4 - ELECTRICAL PLANS
178 GD-I-5
               INSTALLATION DETAILS
                                                                                              248 AT-E-5
                                                                                                             AERATION TANK NO.5 - ELECTRICAL PLAN
               DO ANALYZER/TRANSMITTER ARCHITECTURE & INSTALLATION DETAIL
179 GD-I-6
                                                                                              249 AT-E-6
                                                                                                             BLOWER AREA - ENLARGED PLANS I
                                                                                              250 AT-E-7
180 GD-I-7
                                                                                                             BLOWER AREA — ENLARGED PLANS II
                                                                                              251 AT-E-8
                                                                                                             BLOWER AREA — LIGHTING AND SYSTEMS PLAN
               VALVE COMMUNICATION NETWORK
181 GD-I-8
                                                                                              252 AT-E-9
                                                                                                             BLOWER AREA GROUNDING PLAN
182 P&ID-1
               AERATION TANKS NOS. 1 AND 2 WASTEWATER FLOW
                                                                                              253 AT-E-10
                                                                                                            AERATION TANKS - MISCELLANEOUS PLANS, SECTIONS AND DETAILS
183 P&ID-2
               AERATION TANKS NOS. 3 AND 4 WASTEWATER FLOW
                                                                                              254 FT-E-1
                                                                                                             EXISTING FINAL SETTLING TANKS — DEMOLITION PLAN
184 P&ID-3
               AERATION TANKS NOS. 1 AND 2 AIR DISTRIBUTION
                                                                                              255 FT-E-2
                                                                                                             NEW FINAL SETTLING TANKS — PLANS AND SECTIONS
               AERATION TANKS NOS. 3 AND 4 AIR DISTRIBUTION
185 P&ID-4
                                                                                                             NORTH & SOUTH - SLUDGE RECIRCULATION PUMP STATIONS - DEMOLITION PLANS
                                                                                              256 PS-E-1
186 P&ID-5
               AERATION SYSTEM BLOWER NO. 1
                                                                                              257 PS-E-2
                                                                                                             SOUTH SLUDGE RECIRCULATION PUMP STATION — ELECTRICAL POWER PLANS
187 P&ID-6
               AERATION SYSTEM BLOWER NO. 2
                                                                                              258 PS-E-3
                                                                                                             SOUTH SLUDGE RECIRCULATION PUMP STATION - ELECTRICAL POWER PLANS II
188 P&ID-7
               AERATION SYSTEM BLOWER NO. 3
                                                                                              259 PS-E-4
                                                                                                             SOUTH SLUDGE RECIRC. PUMP STATION - LIGHTING & SYSTEMS PLANS
189 P&ID-8
               AERATION SYSTEM BLOWER NO. 4
                                                                                              260 PS-E-5
                                                                                                             NORTH SLUDGE RECIRCULATION PUMP STATION - ELECTRICAL POWER PLANS I
190 P&ID-9
               AERATION TANK EFFLUENT CHANNEL LOW PRESSURE AIR BLOWERS
                                                                                              261 PS-E-6
                                                                                                             NORTH SLUDGE RECIRCULATION PUMP STATION - ELECTRICAL POWER PLANS II
191 P&ID-10
              NORTH FINAL SETTLING TANKS
                                                                                              262 PS-E-7
                                                                                                             NORTH SLUDGE RECIRC. PUMP STATION - ELECTRICAL LIGHTING & SYSTEMS PLANS
192 P&ID-11
              SOUTH FINAL SETTLING TANKS
                                                                                              263 SP-E-1
                                                                                                             SLUDGE PROCESSING COMPLEX — FILTER AREA DEMOLITION PLANS
193 P&ID-12
             NORTH RAS PUMPS
                                                                                              264 SP-E-2
                                                                                                             SLUDGE PROCESSING COMPLEX - FILTER AREA BASEMENT NEW WORK PLAN
194 P&ID-13
              SOUTH RAS PUMPS
                                                                                              265 SP-E-3
                                                                                                             SLUDGE PROCESSING COMPLEX - FILTER AREA FIRST FLOOR NEW WORK PLAN
195 P&ID-14
              NORTH WAS PUMPS
                                                                                              266 MB-E-1
                                                                                                             MAINTENANCE BUILDING DEMOLITION PLANS
              SOUTH WAS PUMPS
196 P&ID-15
                                                                                              267 MB-E-2
                                                                                                             MAINTENANCE BUILDING - ONE LINE DIAGRAM & PANEL SCHEDULES
197 P&ID-16
             NORTH SLUDGE RECIRCULATION PUMP STATION TANK DRAIN AND SCUM SYSTEM
                                                                                              268 MB-E-3
                                                                                                             MAINTENANCE BUILDING LOWER LEVEL - ELECTRICAL POWER PLAN
198 P&ID-17
              SOUTH SLUDGE RECIRCULATION PUMP STATION TANK DRAIN AND SCUM SYSTEM
                                                                                              269 MB-E-4
                                                                                                             MAINTENANCE BUILDING UPPER LEVEL - ELECTRICAL POWER PLAN
199 P&ID-18
              SODIUM HYDROXIDE TANKS
                                                                                              270 MB-E-5
                                                                                                             MAINTENANCE BUILDING LOWER & UPPER LEVELS — ELECTRICAL LIGHTING & SYSTEMS PLANS
               SODIUM HYDROXIDE PUMPS
200 P&ID-19
                                                                                              271 MB-E-6
                                                                                                             MAINTENANCE SUPPORT FACILITY — ELECTRICAL POWER PLAN
201 P&ID-20
              DAF & AERATION TANKS POLYMER PUMPS
                                                                                              272 MB-E-7
                                                                                                             MAINTENANCE SUPPORT FACILITY - ELECTRICAL LIGHTING & SYSTEMS PLANS
202 P&ID-21
               AERATION TANK NO.5 WASTEWATER FLOW
                                                                                              273 SD-E-1
                                                                                                             ELECTRICAL LIGHTING FIXTURE SCHEDULE I
203 P&ID-22
               AERATION TANK NO.5 AIR DISTRIBUTION
                                                                                              274 SD-E-2
                                                                                                             STANDARD ELECTRICAL DETAILS I
               MISCELLANEOUS I
204 P&ID-23
                                                                                              275 SD-E-3
                                                                                                             STANDARD ELECTRICAL DETAILS II
205 P&ID-24
               MISCELLANEOUS II
                                                                                              276 SD-E-4
                                                                                                             STANDARD ELECTRICAL DETAILS III
206 P&ID-25
              WET WEATHER DISCHARGE
```

ELECTRICAL

207 GD-E-1	ELECTRICAL SYMBOLS AND ABBREVIATIONS I
208 GD-E-2	ELECTRICAL SYMBOLS AND ABBREVIATIONS II
209 GD-E-3	ELECTRICAL AREA CLASSIFICATION SITE PLAN
210 GD-E-4	ELECTRICAL AREA CLASSIFICATION PLANS AND SECTIONS
211 GD-E-5	OVERALL ELECTRICAL SITE DEMOLITION PLAN
212 GD-E-6	ELECTRICAL SITE PLAN I
213 GD-E-7	ELECTRICAL SITE PLAN II
214 GD-E-8	ELECTRICAL SITE LIGHTING PLAN I
215 GD-E-9	ELECTRICAL SITE LIGHTING PLAN II
216 GD-E-10	DUCTBANK SECTIONS I
217 GD-E-11	DUCTBANK SECTIONS II
218 GD-E-12	ELECTRICAL OVERALL EXISTING ONE LINE DIAGRAM
219 GD-E-13	ELECTRICAL OVERALL NEW WORK ONE LINE DIAGRAM
220 GD-E-14	ELECTRICAL SUBSTATION NO. 2 ONE LINE DIAGRAM DIAGRAMS
221 GD-E-15	ELECTRICAL SUBSTATION NO. 4 ONE LINE DIAGRAM DIAGRAMS
222 GD-E-16	ELECTRICAL SUBSTATION NO. 5 AND 5KV MOTOR CONTROL CENTER ONE LINE DIAGRAM
223 GD-E-17	MCC-3B & 3C ONE LINE DIAGRAM
224 GD-E-18	MCC-3A, 3D & 3E ONE LINE DIAGRAM
225 GD-E-19	MCC-7 ONE LINE DIAGRAM
226 GD-E-20	MCC-8 ONE LINE DIAGRAM
227 GD-E-21	MCC-17 & 18 ONE LINE DIAGRAMS
228 GD-E-22	ELECTRICAL GROUNDING DETAILS
229 GD-E-23	ELECTRICAL GROUNDING PLANS & SCHEMATICS
230 GD-E-24	PANELBOARD SCHEDULES I
231 GD-E-25	PANELBOARD SCHEDULES II
232 GD-E-26	PANELBOARD SCHEDULES III
233 GD-E-27	FIRE ALARM & GAS DETECTION RISER DIAGRAMS
234 GD-E-28	PAGE/PARTY & CARD ACCESS RISER DIAGRAMS
235 GD-E-29	INSTRUMENTATION SYSTEM ARCHITECTURE & DATA HIGHWAY DIAGRAMS
236 GD-E-30	INSTRUMENTATION SYSTEM BLOCK DIAGRAMS
237 GD-E-31	POWER MONITORING SYSTEM & PROCESS EQUIPMENT NETWORK DIAGRAMS
238 GD-E-32	CONTROL SCHEMATICS I
239 GD-E-33	CONTROL SCHEMATICS II
240 GD-E-34	CONTROL SCHEMATICS III
241 GD-E-35	CONTROL SCHEMATICS IV
	UNDERGROUND RACEWAY SCHEDULE I
243 GD-E-37	UNDERGROUND RACEWAY SCHEDULE I

RECORD DRAWING

11/09					CADD FILE NOGGPNX002
					DESIGNED BY:
					DRAWN BY: V. BITTO
					SHEET CHK'D BY: W. D. GREEN
					SCALE: NTS
1	1/07	VJB	ZN	REVISED PER ADDENDA NOS. 1 THROUGH 4	APPROVED BY:
REV.	DATE	DRWN	CHKD	REMARKS	DATE: NOVEMBER 2006

CDM Camp Dresser & McKee Inc.

UPPER BLACKSTONE
WATER POLLUTION ABATEMENT DISTRICT
CONTRACT No. UB 3 - 0 - 17512 - 0023

WASTEWATER TREATMENT FACILITY
IMPROVEMENTS - PHASE II

INDEX OF DRAWINGS II

PROJECT NO. 1289\45571 Sht. 3 of 276

GD-2

DESIGN YEAR FLOWS AND LOADINGS

DESIGN INFLUENT FLOWS (mgd)	2010	2020
AVERAGE ANNUAL (AAF)	42	45
MAXIMUM MONTH	70	75
MAXIMUM DAY	106	111
PEAK HOUR	154	160
DESIGN FLOWS TO ADVANCED TREATMENT (mgd)		
AVERAGE ANNUAL (AAF)	43.6	46.6
MAXIMUM MONTH	70	75
MAXIMUM DAY	80	80
PEAK HOUR		120

2010 DESIGN	NFLUENT LOADINGS (Ibs/do	y) (INCLUDING	SEPTAGE)
	AVERAGE ANNUAL	MAXIMUM DAY	MAXIMUM MONTH
BOD	65,700	101,000	75,300
TSS	67,500	135,000	83,900
TKN	7,790	10,500	10,300
Р	1,400	2,330	1,570
2010 DESIGN LOADINGS	TO ADVANCED TREATMENT	(lbs/day) (INCl	LUDING SIDESTREAM
BOD	47,200	76,200	52,700
TSS	30,700	61,200	34,200
TKN	8,790	12,500	9,900
Р	1,750	3,030	2,000

2020 DE	SIGN INFLUENT LOADINGS	(lbs/day) (INCLUDING	SEPTAGE)
	AVERAGE ANNUAL	MAXIMUM DAY	MAXIMUM MONTH
BOD	71,600	110,000	82,100
TSS	73,400	146,000	91,200
TKN	8,860	11,900	11,700
Р	1,620	2,700	1,820
<u></u>	LOADINGS TO ADVANCED	TREATMENT (lbs/day)	(INCLUDING SIDESTREAM)
020 DESIGN	LOADINGS TO ADVANCED AVERAGE ANNUAL	TREATMENT (lbs/day) MAXIMUM DAY	(INCLUDING SIDESTREAM) MAXIMUM MONTH
<u></u>	LOADINGS TO ADVANCED	TREATMENT (lbs/day)	(INCLUDING SIDESTREAM)
020 DESIGN	LOADINGS TO ADVANCED AVERAGE ANNUAL	TREATMENT (lbs/day) MAXIMUM DAY	(INCLUDING SIDESTREAM) MAXIMUM MONTH
020 DESIGN BOD	LOADINGS TO ADVANCED AVERAGE ANNUAL 50,600	TREATMENT (lbs/day) MAXIMUM DAY 81,500	(INCLUDING SIDESTREAM) MAXIMUM MONTH 56,700

PRELIMINARY TREATMENT

INFLUENT SCREENING	
TYPE	catenary
NUMBER OF UNITS	4
UNIT CAPACITY	40 mgd
CLEAR SPACING OF BARS	5/8 inch
CHANNEL WIDTH	4.5 ft
CHANNEL DEPTH	
EAST	11 ft
WEST	10 ft
AERATED GRIT	
NUMBER OF TANKS	4
DETENTION TIME @ PEAK FLOW	(2020)
EAST	3.5 min
WEST	6.0 min
UNIT DIMENSIONS	
LENGTH	60 ft
WIDTH	
EAST	15 ft
WEST	25 ft
SIDEWATER DEPTH	15 ft
AIR SUPPLY	
NUMBER OF BLOWERS	3
TYPE OF BLOWER	positive displacement
BLOWER CAPACITY	600 scfm @ 7.3 psi

PRIMARY TREATMENT

PRIMARY SETTLING TANKS	
- All All Server of the server	
NUMBER OF UNITS	7
UNIT DIMENSIONS	
LENGTH	200 ft
WIDTH	40 ft
SIDEWATER DEPTH	10 ft
TOTAL SURFACE AREA	56,000 sq ft
OVERFLOW RATE (based on	7 tanks in service)
AVERAGE ANNUAL	750 gpd/sq ft (804 gpd/sq ft)
PEAK HOUR	2,750 gpd/sq ft (2,857 gpd/sq

SECONDARY TREATMENT (SEE NOTES 1, 2 AND 3)

ANAEROBIC ZONE	
NUMBER OF TRAINS	4 (5)
STAGES PER TRAIN	3
STAGE DIMENSIONS	
A (LENGTH x WIDTH x SIDE WATER DEPTH)	36 ft x 41 ft x 15.9 ft
В	36 ft x 41 ft x 15.9 ft
С	47 ft x 84 ft x 15.9 ft
VOLUME	
PER TRAIN	0.82 MG
TOTAL	3.3 MG (4.1 MG)
F/M (Ib BOD/ Ib MLSS) (SEE NOTE 4)	
A	2.4 (1.9)
В	1.2 (0.94)
С	0.51 (0.41)
HYDRAULIC RETENTION TIME	(FORWARD FLOW ONLY)
AVERAGE ANNUAL	1.7 hr (2.2 hr)
PEAK HOUR	0.66 hr (0.82 hr)
ANOXIC ZONE	
NUMBER OF TRAINS	4 (5)
STAGES PER TRAIN	2
STAGE DIMENSIONS	
D (LENGTH x WIDTH x SIDE WATER DEPTH)	36 ft x 84 ft x 15.3 ft
E (LENGTH x WIDTH x SIDE WATER DEPTH)	37 ft x 84 ft x 14.8 ft
VOLUME	
PER TRAIN	0.69 MG
TOTAL	2.8 MG (3.5 MG)
HYDRAULIC RETENTION TIME	(forward flow only)
AVERAGE ANNUAL	1.5 hr (1.8 hr)
PEAK HOUR	2.5 hr (3.1 hr)
AEROBIC ZONE	
NUMBER OF TRAINS	4 (5)
UNIT DIMENSIONS	
LENGTH	345 ft
WIDTH	84 ft
SIDEWATER DEPTH	14.3 ft
VOLUME	
PER TRAIN	3.1 MG
TOTAL	12.4 MG (15.5)
SRT A/O AND MLE	10 DAY (13 DAY)
A2/0	8 DAY (10 DAY)
MLSS / MLVSS	4,100 mg/l / 3,280 mg/
HYDRAULIC RETENTION TIME	(forward flow only)
AVERAGE ANNUAL	6.6 hr (8.2 hr)
PEAK HOUR	2.5 hr (3.1 hr)
INTERNAL RECYCLE PUMPS	· · · · · · · · · · · · · · · · · · ·
NUMBER OF UNITS	8 (10)
TYPE	submersible propeller
CAPACITY	12,500 gpm @ 4.8 ft
MOTOR HORSEPOWER	40 hp
AVERAGE INTERNAL RECYCLE RATE SUMMER	320% AAF
AVERAGE INTERNAL RECYCLE RATE WINTER	130% AAF
BLOWERS	
NUMBER OF UNITS	4
TYPE	single stage centrifugal
CAPACITY	17,900 acfm
MOTOR HORSEPOWER	800 hp

SECONDARY TREATMENT (CONT'D) (SEE NOTES 3 AND 5)

NUMBER OF UNITS	8
TYPE	circular w/rapid sludge uptake
DIMENSIONS	
DIAMETER	140 feet
SIDEWATER DEPTH	14.6 feet
UNIT SURFACE AREA	15,400 sqft
TOTAL SURFACE AREA	123,150 sq ft
UNIT VOLUME	224,800 cu ft
TOTAL VOLUME	1,798,700 cu ft
OVERFLOW RATE	
AVERAGE ANNUAL	378 gpd/sq ft
PEAK HOUR	974 gpd/sq ft
SOLIDS LOADING	
AVERAGE ANNUAL	21 lbs/d/sq ft
PEAK HOUR	49 lbs/d/sq ft
DETENTION TIME	
AVERAGE ANNUAL ANNUAL	7.1 hr
PEAK HOUR	2.7hr

RETURN ACTIVATED SLUDGE PUMPS	
NUMBER OF UNITS	10 [8 operating, 2 standby]
TYPE	vertical non clog centrifugul
CAPACITY (125% AAF)	4,900 gpm @ 36 FT
MOTOR HORSEPOWER	60 hp
AVERAGE RAS RATE	69 % AAF

WASTE ACTIVATED SLUDGE PUMPS	
NUMBER OF UNITS	6 [4 operating, 2 standby]
TYPE	horizontal non clog centrifugul
CAPACITY (10 DAY SRT)	350 gpm @ 60 FT
MOTOR HORSEPOWER	10hp

SCUM PUMPS		
NUMBER OF UNITS	2	
TYPE	hose pumps	
CAPACITY	125 gpm	
MOTOR HORSEPOWER	25hp	

DRAIN PUMPS	
NUMBER OF UNITS	2
TYPE	Vertical non clog centrifugal
CAPACITY	1800 gpm @ 26ft
MOTOR HORSEPOWER	20hp

DISINFECTION / DECHLORINATION

NUMBER OF CONTACT TANKS	2
TOTAL VOLUME	0.76 MG
DETENTION TIME (2020)	
AVERAGE ANNUAL	24.3
PEAK HOUR	9.1
DISINFECTANT	SODIUM HYPOCHLORITE
PEAK DOSAGE	
@ AVERAGE FLOW	20 mg/l
@ PEAK FLOW	8 mg/l
@ PEAK BYPASS FLOW	12 mg/l

CHEMICAL	SODIUM BISULFITE
DOSAGE	1.6 mg/l per mg/l residual

(MULTIPLE-HEARTH FURNACE/AIR POLLUTION CONTROL

MULTIPLE-HEARTH FURNACE (with flu	e gas recirculation)
NUMBER OF INCINERATORS	2
CAPACITY (each incinerator)	
MAXIMUM THROUGHPUT	3.0 dry tons/hour
FLUE GAS RECIRCULATION (FGR) F	ANS WITH VFD'S
NUMBER OF FANS	2
MOTOR HORSEPOWER	125 hp
DESIGN AIR FLOW RATE	50,000 acfm @ 1000 deg F
DESIGN STATIC PRESSURE	5 in water column
AIR POLLUTION CONTROL - WET ELEC	CTROSTATIC PRECIPITATORS (WESP)

AIR POLLUTION CONTROL - V	WET ELECTROSTATIC PRECIPITATORS (WESP)
NUMBER	2
UNIT DIMENSIONS	
DIAMETER	10.5 ft
HEIGHT	45 ft
SPECIFIC COLLECTION AREA	A (SCA) 130 sq ft/1000 acfm
OUTLET PARTICULATE	0.008 Grains/dscf
CONCENTRATION	Corrected to 7% 0 ₂

ODOR CONTROL

BIOFILTER				
SOURCE	screenings,	grit,	primary influent	and effluent channels
PROCESS AIR FLO'	N		18,000 cf	m
STATIC PRESSURE			10 in WG.	
DIMENSIONS				
WIDTH			20 ft	
LENGTH			67 ft	
MEDIA DEPTH			7 ft 6 in	
AIR HEATER			200,000	3TU

ACTIVATED CARBON	
SOURCE	sludge holding and receiving tanks
NUMBER OF CARBON CANISTERS	2
UNIT DIMENSIONS	
DIAMETER	6 ft
BED DEPTH	3 ft
AIR FLOW (each)	2,000 cfm
PRESSURE DROP	12 in water column across each bed

FLOW MEASUREMENT

	INFLUENT — PARSHALL FLUME		
	WIDTH	12 ft	
ĺ	RATED CAPACITY	336 mgd	

	ADVANCED TREATMENT BYPAS	S - PALMER - BOWLUS - FLUME	
	PALMER-BOWLUS FLUME		
	WIDTH	72 in	
	RATED CAPACITY	120 mgd	
(

NOTES:

- VALUES SHOWN PARENTHETICALLY REFLECT DESIGN CRITERIA IF ADD ALTERNATE NO. 2 (AERATION TANK 5) IS CONSTRUCTED.
- VALUES SHOWN REFLECT DESIGN CRITERIA UNDER 2020 FLOWS AND LOADS.
- SIDEWATER DEPTH BASED ON AVERAGE HYDRAULIC PROFILE.
- F/M VALUES BASED ON MAXIMUM MONTH 2020 LOAD.
- PUMP UNITS ARE EQUALLY DIVIDED BETWEEN NORTH AND SOUTH PUMP STATIONS.

RECORD DRAWING

1 1	/09					MDMODOOA
1 1 /	7 0 9					CADD FILE NOMDNCR001
						DESIGNED BY: M. NEVILLE
						DRAWN BY:
						SHEET CHK'D BY: W. D. GREEN
						SCALE: NONE
						APPROVED BY:
R	EV.	DATE	DRWN	CHKD	REMARKS	DATE: NOVEMBER 2006

consulting engineering construction operations	Camp Dresser & McKee Inc.

UPPER BLACKSTONE WATER POLLUTION ABATEMENT DISTRICT CONTRACT No. UB 3 - 0 - 17512 - 0023

WASTEWATER TREATMENT FACILITY IMPROVEMENTS - PHASE II

DESIGN CRITERIA - PHASE II

PROJECT NO. 1289\45571

Sht. 4 of 276 GD-3

