FEATURE: Groundwater Monitoring

PROJECT: San Joaquin River Restoration Program

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

WATER LEVEL DEPTH AND ELEVATION: 12.2 ft. b.g.s. (El. 123.8 ft.)

COORDINATES: N 2,225,169.7 E 6,133,414.5 (NAGD83)

BEGUN: 3/21/10 FINISHED: 3/21/10

TOTAL DEPTH: 31.1 ft.

DATE WATER LEVEL WAS MEASURED: 3/21/2010

STATE: California

GROUND SURFACE ELEVATION: 136.0 ft. (NAVD88)

T.O.C ELEVATION: 139.1 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

						LABO	ORAT	ORY	DATA	١		>Z /		z /	L			
	NOTES	Ŧ	>						- - 	>	%	CATIC CATIC	_	N AL	J. C. L.	CLASSIFICATION AND		
	NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION FI EVATION	ר אין	VISUAL CLASSIFICATION ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION		
	ALL MEASUREMENTS ARE IN FEET FROM THE GROUND			-			J			_			+	/		0.0 to 31.1 feet QUATERNARY ALLUVIUM (Qal)		
	SURFACE. PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_														0.0 to 3.7 ft.: SILTY SAND, SM: About 75% micaceous, fine sand; about 25% nonplastic fines; maximum size: fine sand; dry to moist, brown, organic odor; soft, abundant organic material and roots.		
	LOCATION: Reach 3, RM 187, river left, about 350 feet west from the center of the SJR, about 1,200 north of Oxalis Road.	_	33										:	SM		3.7 to 5.0 ft.: CLAYEY SAND, SC: About 55% micaceous, fine sand; about 45% fines with medium plasticity, toughness and dry strength; maximum size: fine sand; dry to moist, brown, organic odor; soft, abundant organic material and roots.		
	DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller															<u>Laboratory Data Interval</u> 3.7 to 4.8 ft.		
	Cody Kelly, Helper Ken Kreitz, Helper	_														 5.0 to 7.6 ft.: POORLY GRADED SAND, SP About 95% micaceous, fine sand; about 5% nonplastic fines; maximum size: fine sand; moist to wet, gray brown; soft. 		
	Central Mining Equipment 75 drill rig (CME-75)												+	132.3		7.6 to 10.7 ft.: FAT CLAY, CH: About 95%		
	DRILLING & SAMPLING METHODS: Drill hole MW-10-74 was advanced using hollow stem flight augers with	_		23.9	20.2	44.1	55.9	0.0	28.3	9.2	14.0	SC	:	SC		fines with high plasticity, toughness and dry strength, no dilatancy; about 5% fine sand; maximum size: fine sand; moist, dark brown; no reaction with HCl; firm, lenses of SC from 10.0 to 10.7 ft.		
	a continuous dry core sampling system (FADC) from the ground surface to a total depth of 31.1 feet. FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel.	5—										131.2	2	131.0		10.7 to 12.2 ft.: CLAYEY SAND, SC: About 60 % fine sand; about 40 % fines with medium plasticity; maximum size: fine sand; moist, olive brown; moderately soft, sand percentage increases with depth.		
	Interval Method 0.0 to 31.1 ft FADC	_													Qal	12.2 to 13.6 ft.: POORLY GRADED SAND WITH CLAY, SP/SC: About 90% fine sand; about 10% fines with medium plasticity;		
	DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 23.6 ft. smooth drilling, wet at 13.6 ft. 23.6 to 31.1 ft. very firm drilling	_	100											SP		maximum size: fine sand; wet, olive brown with reddish brown oxidation; layer of s(CL) with about 65% fines with medium plasticity, toughness and dry strength; about 35 % fine sand; moist, olive brown with reddish brown oxidation layers; moderately firm, stratified.		
	CAVING CONDITIONS: None													128.4		<u>Laboratory Data Interval</u> 12.7 to 12.9 ft.		
	DRILL FLUID, RETURN AND COLOR: 0.0 to 13.6 ft. None 13.6 to 31.1 ft. Water, no return	_														13.6 to 14.9 ft.: POORLY GRADED SAND, SP: About 95% fine sand; about 5% fines; maximum size: fine sand; wet, gray to tan; loose, soft, free water at 14.9 ft.		
	WATER LEVEL: 12.2 ft. b.g.s. on 3/21/2010															<u>Laboratory Data Interval</u> 13.6 to 14.9 ft.		
SJRRP.GPJ	REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	=												СН		 14.9 to 16.3 ft.: CLAYEY SAND, SC: About 85% fine sand; about 15% fines with medium plasticity; maximum size: fine sand; wet, gray to tan with few reddish brown oxidation veinlets, moderately soft. 		
DATABASE: SJR	HOLE COMPLETION: Well Casing: +3.1 to 10.0 ft. (T.O.C. El. 139.1 ft.) Dual U-pack Screen: 10.0 to 25.0	10—														16.3 to 18.6 ft.: LEAN CLAY WITH SAND, (CL)s: About 80% fines with medium plasticity; about 20% fine sand; maximum size: fine sand; moist, olive brown with		
PROJECT DA	t. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 9.5 to 31.1 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap)	_	98										-	125.3		reddish brown oxidation; firm. <u>Laboratory Data Interval</u> 16.3 to 18.6 ft.		
ĮII.	Bentonite Seal: 2.0 to 9.5 ft. Well Completion: Steel surface casing with locking top, square 6-inches-wide and 5-foot-long.	nite Seal: 2.0 to 9.5 ft. Completion: Steel surface y with locking top, square						SC										
L HOL	COMMENTS:																	
REPORT: SJRRP DRILL HOLE	FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile		O.D. = G.S. = b.g.s. T.O.C SJR =	= Grou = Bel 5. = To	urface e grou well ca	und su asing	rface			C	Completion D	Diag	gram. Well dev	ed in attached Well ent information is Development form.				
REP	IZINI = IZIACI INIIIG				DA	TE: 9/	15/2010)	SHEE	Т 1 С	OF_3	DRILL HO	LE	MW-10-74		RECLAMATION Managing Water in the West		

FEATURE: Groundwater Monitoring

PROJECT: San Joaquin River Restoration Program

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

COORDINATES: N 2,225,169.7 E 6,133,414.5 (NAGD83)

BEGUN: 3/21/10 FINISHED: 3/21/10 TOTAL DEPTH: 31.1 ft.

WATER LEVEL DEPTH AND ELEVATION: 12.2 ft. b.g.s. (El. 123.8 ft.)

DATE WATER LEVEL WAS MEASURED: 3/21/2010

STATE: California

GROUND SURFACE ELEVATION: 136.0 ft. (NAVD88)

T.O.C ELEVATION: 139.1 ft. (NAVD88) HOLE LOGGED BY: A. Warren

REVIEWED BY: J. Vauk

T	LABORATORY DATA								١		∑N		N O		⊨		
	NOTES	DEРТН	R. R.					П	IMIT	È	RE IT %	SATOR	/ N	SUAL FICATI	/ g	SIC UN	CLASSIFICATION AND
		DE	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	ПООІБ ШМІТ	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
			98									Ţ	_	SC	123.8		18.6 to 21.5 ft.: SANDY LEAN CLAY, s(CL) : About 65% fines with medium plasticity; about 35% fine sand; maximum size: fine sand; moist, olive brown with reddish brown
		_		21.4	13.2	34.6	65.4	0.0	NP	NP	17.2	SM	123.1	SP/SC			oxidation; firm; interbedded fine layers of SC to s(CL) throughout, layer of SP with about 95% fine sand and 5% fines from 18.6 to 19.1 ft.
															122.4		<u>Laboratory Data Interval</u> 19.1 to 20.1 ft.
		_		11.6	6.3	17.9	82.1	0.0	NP	NP	19.1	SM		SP			21.5 to 22.5 ft.: <u>LEAN CLAY, CL</u> : About 90% fines with medium plasticity; about 10% fine sand; maximum size: fine sand; moist, olive brown with reddish brown oxidation; firm.
		15—											121.1		121.1		22.5 to 23.6 ft.: CLAYEY SAND, SC: About 85 to 90% fine sand; about 10 to 15% fines with medium plasticity; maximum size: fine sand; moist to wet, olive brown with reddish brown layers; tree bark present; firm.
		_	100											SC	119.7		23.6 to 27.6 ft.: POORLY GRADED SAND, SP: About 95 to 100% micaceous, fine sand; about 5% to trace fines; maximum size: fine sand; wet, gray brown; moderately soft.
		_													119.7		27.6 to 28.6 ft.: SILT, ML: About 95 to 100% fines with low plasticity, no toughness, rapid dilatancy; about 5% to trace fine sand; maximum size: fine sand; moist, olive brown; moderately firm.
				44.2	42.3	86.5	13.5	0.0	31.0	14.9	24.0	CL		(CL)s			<u>Laboratory Data Interval</u> 27.6 to 28.3 ft.
		_														Qal -	28.6 to 31.1 ft.: POORLY GRADED SAND, SP: About 95 to 100% micaceous, fine sand; about 5% to trace fines; maximum size: fine sand; wet, gray brown; soft, loose.
													117.4		117.4		T.D. = 31.1 ft.
		_															-
				61.1	15.8	76.9	23.1	0.0	24.6	4.5	24.2	(CL-MI	L)s				
		20—											115.9	s(CL)			_
		_	100														-
JRRP.GP.															114.5		
PROJECT DATABASE: SJRRP.GPJ		-												CL			-
СТ ВАТА															113.5		
PROJE		_												sc			-
															112.4		
_ _ _ _ _			74											SP			
REPORT: SJRRP DRILL HOLE	COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		O.D. : G.S. : b.g.s. T.O.C SJR :	= Grou = Bel 5. = To	und su ow the	urface e grou vell ca	ınd su ısing	rface				Comple	tion Dia	gram. W	ell deve	elopme	d in attached Well nt information is Development form.
REP	RM = River Mile			_	DA	TE: 9/	15/2010		SHEE.	T 2 ()F 3	DRIL	LL HOLE	MW-10-	74		RECLAMATION Managing Water in the West

SHEET 3 OF 3

FEATURE: Groundwater Monitoring

PROJECT: San Joaquin River Restoration Program

LOCATION: Reach 3. Left Side of River. Near Oxalis Ave. BEGUN: 3/21/10 FINISHED: 3/21/10

DATE WATER LEVEL WAS MEASURED: 3/21/2010

WATER LEVEL DEPTH AND ELEVATION: 12.2 ft. b.g.s. (El. 123.8 ft.)

COORDINATES: N 2,225,169.7 E 6,133,414.5 (NAGD83)

TOTAL DEPTH: 31.1 ft.

HOLE LOGGED BY: A. Warren

GROUND SURFACE ELEVATION: 136.0 ft. (NAVD88)

CLASSIFICATION AND

PHYSICAL CONDITION

T.O.C ELEVATION: 139.1 ft. (NAVD88)

STATE: California

REVIEWED BY: J. Vauk

LABORATORY DATA VISUAL CLASSIFICATION Ę MOISTURE CONTENT % DEPTH LIQUID LIMIT PLASTICITY INDEX GEOLOGIC U SYMBOL % CORE RECOVERY ELEVATION **NOTES** ELEVATION % GRAVEL % CLAY % FINES % SAND % SILT 25 SP 74 108.4 Qal 97.3 2.7 0.0 30.0 7.2 29.6 ML ML 107.7 107.4 100 SP 30 104.9

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

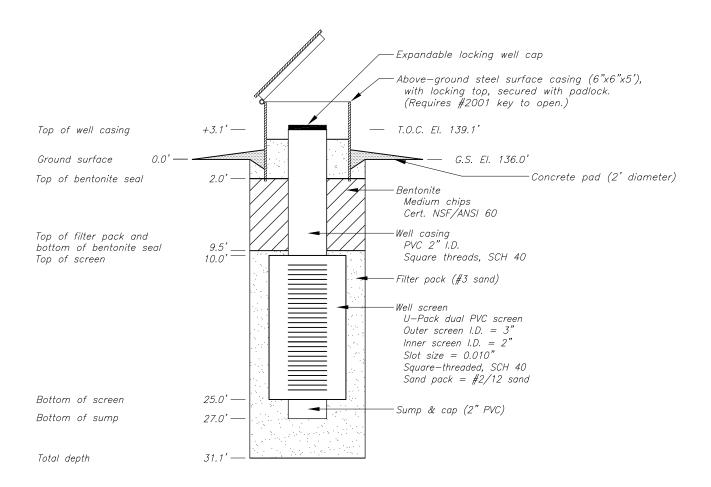
Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.



BOTTOM OF HOLE

MW-10-74	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 3/21/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2225169.7 E6133414.5 (NAD83) ELEVATION 139.1' (NAVD88)
GROUND SURFACE ELEVATION 136.0' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-75

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

BEGUN: 3/20/10 FINISHED: 3/20/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,225,434.3 E 6,131,821.9 (NAGD83)

TOTAL DEPTH: 30.7 ft.

STATE: California GROUND SURFACE ELEVATION: 131.8 ft. (NAVD88)

T.O.C ELEVATION: 133.1 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABORATORY D			DATA	١				NO /	l _⊨ l	
NOTES	DEРТН	 ≿					н	⊢W	≽	₹ T%	ATOF	/ 8	UAL FICATI		CLASSIFICATION AND
NOTES	DEF	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY	ELEVATION	VISUAL CLASSIFICATION ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.															0.0 to 30.7 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	_													0.0 to 3.0 ft.: SANDY LEAN CLAY, s(CL) About 55% fines with low plasticity, slow dilatancy; about 45% fine sand; maximum size: fine sand; moist, brown, organic odor; moderately firm, fine beds of sand.
LOCATION: Reach 3, RM 187, river left, about 1,870 feet west from the center of the SJR, about 1,400 feet north of	_												s(CL)		3.0 to 4.0 ft.: POORLY GRADED SAND, SP: About 100% fine sand; trace fines; maximum size: fine sand; moist to dry, brown; loose, soft, homogenous, micaceous.
Oxalis Road. DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller		82													4.0 to 6.3 ft.: FAT CLAY, CH: About 95% fines with high plasticity, high toughness; about 5 % fine sand; maximum size: fine sand; moist, dark brown; mottled, very firm.
Cody Kelly, Helper Ken Kreitz, Helper	_												128.8		6.3 to 7.7 ft.: LEAN CLAY WITH SAND, (CL)s: About 85% fines with medium plasticity, slow dilatancy, medium toughness;
DRILL RIG: Central Mining Equipment 75 drill rig (CME-75)													SP 127.7		plasticity, slow dialarity, inedutin'i dugliness, about 15% fine sand; maximum size: fine sand; moist, olive brown mottled with dark brown, soft, gradual contact between layers.
DRILLING & SAMPLING METHODS: Drill hole MW-10-75 was advanced using hollow stem flight augers with															7.7 to 8.7 ft.: SILTY SAND, SM: About 60% fine sand; about 40% fines with low plasticity; maximum size: fine sand; moist, olive brown; moderately soft, stratified.
a continuous dry core sampling system (FADC) from the ground surface to a total depth of 30.7 feet. FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel.	5—	_											СН		8.7 to 9.6 ft.: LEAN CLAY WITH SAND, (CL)s: About 85% fines with medium plasticity; about 15% fine sand; maximum size: fine sand; moist, olive brown; moderately soft, stratified, lightly cemented in layers from 8.7 to 9.6 ft.
Interval Method 0.0 to 30.7 ft FADC	_												405.5	Qal —	<u>Laboratory Data Interval</u> 8.7 to 9.6 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 4.4 ft. smooth drilling, soft 4.4 to 8.7 ft. moderately soft 8.7 to 18.7 ft. firm	_	100										125.5 (CL)s		9.6 to 10.9 ft.: CLAYEY SAND, SC: About 60% sand; 40% fines with medium plasticity; maximum size: fine sand; moist, tan; firm, layered.	
18.7 to 23.7 ft. moderately soft 23.7 to 25.5 ft. refusal, moved sampler inside 0.2 ft. 25.5 to 30.7 ft firm													124.1		<u>Laboratory Data Interval</u> 9.6 to 10.9 ft. 10.9 to 14.7 ft.: <u>SANDY LEAN CLAY, s(CL)</u>
CAVING CONDITIONS: None DRILL FLUID, RETURN AND	_	_											SM		: About 65% fines with medium to low plasticity, medium toughness; about 35% fine to medium sand; maximum size: medium sand; wet, olive brown with reddish brown oxidation veins; stratified.
COLOR: 0.0 to 18.7 ft. None													123.1		14.7 to 17.6 ft.: SILT WITH SAND, (ML)s
18.7 to 30.7 ft. Water, no return WATER LEVEL: Not measured	_		64.3	22.6	86.9	13.1	0.0	27.2	7.2	21.9	CL		(CL)s		About 75% fines with low plasticity, rapid dilatancy; about 25% fine sand; maximum size: fine sand; wet, olive brown, moderately firm.
REASON FOR HOLE TERMINATION:											12	22.4	122.4	-	Laboratory Data Interval 14.7 to 17.6 ft.
The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: +1.3 to 13.7 ft. (T.O.C.	10—	_	29.6	13.5	43.1	56.9	0.0	23.4	5.5	18.3	SC-SM		sc		17.6 to 18.7 ft.: <u>SILTY SAND, SM</u> : About 75% fine sand; about 25% fines with no to low plasticity; maximum size: fine sand; wet, olive brown with reddish brown oxidation; very firm micaceous.
El. 133.1 ft.) Dual U-pack Screen: 13.7 to 28.7 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 13.2 to 30.7 ft. (#3 Sand)	_	96									1:	20.9	120.9		18.7 to 20.0 ft.: SILTY SAND TO SANDY SILT, SM/ML: About 50% fine sand; about 50% fines with low plasticity, rapid dilatancy; maximum size: fine sand; wet, olive brown, moderately firm.
Sump: 28.7 to 30.7 ft. (2-inch blank PVC with cap)													s(CL)		moderatory mm.
COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Completion Diagram. Well development information provided in attached Monitoring Well Development											information is velopment form.		
RM = River Mile			Г	DV	TE: 0/	15/201	<u>, T</u>	SHEE.	T 1 /	JE 3	DRILL	HO! F	MW-10-75		RECLAMATION Managing Water in the West

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

BEGUN: 3/20/10 FINISHED: 3/20/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,225,434.3 E 6,131,821.9 (NAGD83)

TOTAL DEPTH: 30.7 ft.

STATE: California GROUND SURFACE ELEVATION: 131.8 ft. (NAVD88)

T.O.C ELEVATION: 133.1 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	4		×O	$\overline{\mathcal{I}}$	NO /	E	
NOTES	рертн	I K			,,		ÆL	LIMI1	Ε̈́	RE YT %	RATOF	/ <u>8</u>	SUAL		CLASSIFICATION AND
	<u> </u>	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	GEOLOGIC UNIT	PHYSICAL CONDITION
sentonite Seal: 2.0 to 13.2 ft. Vell Completion: Steel surface asing with locking top, square -inches-wide and 5-foot-long.	_	96									/		s(CL)		20.0 to 23.7 ft.: SILT, ML: About 95% fines with no plasticity, rapid dilatancy, no toughness; about 5% fine sand; maximum size: fine sand; wet, olive brown with reddis brown veinlets, very firm to firm; finely stratified. Laboratory Data Interval
															20.0 to 23.7 ft.
	_														23.7 to 24.7 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine, micaceous sand; about 10% nonplastic fine maximum size: fine sand; wet, olive brown, flowing and loose.
	15—												117.		24.7 to 25.5 ft.: SILT WITH SAND, (ML)s About 75% fines with no plasticity, toughner or dry strength, rapid dilatancy; about 25% fine sand; maximum size: fine sand; wet, old brown with reddish brown bands; very firm, lightly to moderately cemented in thin siltstoto sandstone layers.
	_														Laboratory Data Interval 24.7 to 25.5 ft.
		100	55.8	17.1	72.9	27.1	0.0	21.9	3.5	27.3	(ML)s		(ML)s		25.5 to 28.7 ft.: SILTY SAND, SM: About 75% fine sand; about 25% fines with mediu plasticity; maximum size: fine sand; wet, oli brown, flowing and loose.
	-														Laboratory Data Interval 25.5 to 28.7 ft.
												114.2	114.	_	28.7 to 30.7 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine sand;
	_	-											SM	Qal	about 10% fines with medium plasticity; maximum size: fine sand; wet, olive brown, flowing and loose. No recovery from 28.7 t 30.7 ft, residue of sand in sampler and drilli action were used to describe the soil.
													113.		T.D. = 30.7 ft.
	_												SM/ML		
	20-												113.	_	_
	_														_
		100													
	_		83.5	10.3	93.8	6.2	0.0	NP	NP	28.9	ML		ML		
	_														
		400										108.1	108.		
COMMENTS:		100								_			SP/SM		
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		G.S.: b.g.s. T.O.0	= Bel	und so low th op of v	urface	ınd su asing	rface			Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.					
RM = River Mile						- '									RECLAMATION Managing Water in the Wes



FEATURE: Groundwater Monitoring

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

BEGUN: 3/20/10 FINISHED: 3/20/10
WATER LEVEL DEPTH AND ELEVATION: NA
DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,225,434.3 E 6,131,821.9 (NAGD83)

TOTAL DEPTH: 30.7 ft.

STATE: California
GROUND SURFACE ELEVATION: 131.8 ft. (NAVD88)

T.O.C ELEVATION: 133.1 ft. (NAVD88) HOLE LOGGED BY: A. Warren

REVIEWED BY: J. Vauk

LABORATORY DATA LABORATORY CLASSIFICATION VISUAL CLASSIFICATION Ę **CLASSIFICATION AND** MOISTURE CONTENT % DEPTH LIQUID LIMIT PLASTICITY INDEX GEOLOGIC U SYMBOL % CORE RECOVERY ELEVATION **NOTES** ELEVATION % GRAVEL PHYSICAL CONDITION % CLAY % FINES % SAND % SILT SP/SM 100 107.1 25 NP NP М (ML)s 69.7 18.5 88.2 11.8 0.0 30.3 106.3 106.3 SM SM 63 20.6 7.3 27.9 72.1 0.0 NP 19.5 Qal 103.1 103.1 0 SP/SM 30 101. BOTTOM OF HOLE

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

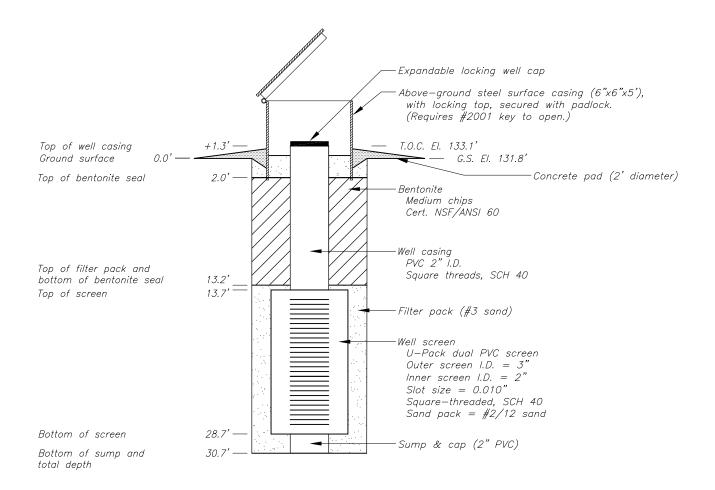
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.



MW-10-75	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 3/20/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2225434.3 E6131821.9 (NAD83) ELEVATION 133.1' (NAVD88)
GROUND SURFACE ELEVATION 131.8' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-76

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

BEGUN: 3/19/10 FINISHED: 3/19/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,224,164.6 E 6,127,385.3 (NAGD83)

TOTAL DEPTH: 34.1 ft.

STATE: California GROUND SURFACE ELEVATION: 130.7 ft. (NAVD88)

T.O.C ELEVATION: 133.1 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABORATORY DA			DATA	Α		RY 10N		NO	늘	
NOTES	DEPTH	E ERY					린	LIΜΙΤ	Ĕ	RE \T %	RATOI FICAT	5	SUAL FICAT	Sic UN BOL	CLASSIFICATION AND
	<u> </u>	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVAI	VISUAL CLASSIFICATION ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.													/		0.0 to 2.6 feet FILL (FIII)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_												SM	Fill	0.0 to 2.6 ft.: SILTY SAND, SM: About 60% fine to medium sand; about 40% nonplastic fines; maximum size: medium sand; dry to moist, dark brown, organic odor; no reaction with HCl; micaceous; soil material has been disturbed by agricultural and road grading activities.
LOCATION: Reach 3, RM 187, river left, about 1.3 miles west from the center of the	_	80													2.6 to 34.1 feet QUATERNARY ALLUVIUM (Qal)
SJR, about 810 feet east of the intersection of Oxalis Road and Orsmby Street.		00											128.1		2.6 to 7.1 ft.: FAT CLAY, CH: About 100% fines with high plasticity, toughness, no dilatancy; trace fine sand; maximum size: fine
DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper	_												120.1		sand; dry to moist, dark brown; no reaction with HCl, very firm, becomes less firm with depth, roots present from 6.8 to 7.1 ft.
Ken Kreitz, Helper DRILL RIG: Central Mining Equipment 75 drill rig (CME-75)	drill rig														7.1 to 11.5 ft.: SILTY CLAY, CL/ML: About 90% fines with low plasticity and toughness, slow dilatancy; about 10% fine sand; maximum size: fine sand; moist, olive brown with reddish brown oxidation veinlets; no reaction with HCI: moderately soft; finely
DRILLING & SAMPLING METHODS: Drill hole MW-10-76 was advanced using hollow stem flight augers with															stratified CL and ML layers. Laboratory Data Interval 7.1 to 9.1 ft.
a continuous dry core sampling system (FADC) from the ground surface to a total depth of 34.1 feet. FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel.	5—												CH		— 11.5 to 13.9 ft.: POORLY GRADED SAND; SP: About 95% fine to medium sand; about 5% nonplastic fines; maximum size: medium sand; moist to wet, olive brown with reddish brown oxidation layers; soft, stratified.
Interval Method 0.0 to 34.1 ft FADC	_														Laboratory Data Interval 11.5 to 13.9 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 14.1 ft. smooth drilling, soft 14.1 to 19.1 ft. soft, wet 19.1 to 34.1 ft. soft, very wet	_	96											123.6		13.9 to 14.1 ft.: SILTY CLAY, CL/ML: About 90% fines with low plasticity and toughness, slow dilatancy; about 10% fine sand; maximum size: fine sand; moist, olive brown with reddish brown oxidation veinlets; no reaction with HCl; moderately soft.
CAVING CONDITIONS: None														Qal	14.1 to 14.9 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to
DRILL FLUID, RETURN AND COLOR: 0.0 to 19.1 ft. None	_		54.8	37.4	92.2	7.8	0.0	28.8	5.3	28.2	ML				medium sand; about 10% nonplastic fines; maximum size: medium sand; wet, olive brown; soft.
19.1 to 34.1 ft. Water, no return WATER LEVEL: Not measured	_							28.8			121.6	6			14.9 to 16.3 ft.: LEAN CLAY WITH SAND, (CL)s: About 80% fines with medium plasticity, low toughness; about 20% fine sand; maximum size: fine sand; moist, olive brown with reddish brown and black oxidation;
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.													CL/ML		moderately firm. 16.3 to 17.7 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% fines with no to low
epth. IOLE COMPLETION: Vell Casing: +2.4 to 10.0 ft. (T.O.C. il. 133.1 ft.) Jual U-pack Screen: 10.0 to 25.0 ft.	10-														plasticity; maximum size: medium sand; wet, olive brown with reddish brown oxidation; band of oxidation at contact from 17.5 to 17.7 ft.
(Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 9.5 to 34.1 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap)	Iter Pack: 2/12 Sand i to 34.1 ft. (#3 Sand) 27.0 ft. (2-inch blank										17.7 to 20.5 ft.: SILTY SAND, SM: About 65 to 75% fine sand; about 25 to 35% nonplastic fines; maximum size: fine sand; wet, olive brown; moderately firm, homogenous.				
Bentonite Seal: 2.0 to 9.5 ft. Well Completion: Steel surface casing with locking top, square 6-inches-wide and 5-foot-long. COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile		92											119.2 SP		<u>Laboratory Data Interval</u> 17.7 to 19.1 ft.
COMMENTS:															
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile		G.S. : b.g.s. T.O.C	= Gro = Bel : = To	und surface Completic				Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.							
IZIAI — IZIACI IAIIIC			Γ	DA	TF: 9/	15/201	0	SHEE	T 1 ()F 3	DRILL HO	LE	MW-10-76		RECLAMATION Managing Water in the West

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, Left Side of River, Near Oxalis Ave.

BEGUN: 3/19/10 FINISHED: 3/19/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,224,164.6 E 6,127,385.3 (NAGD83)

TOTAL DEPTH: 34.1 ft.

STATE: California GROUND SURFACE ELEVATION: 130.7 ft. (NAVD88)

T.O.C ELEVATION: 133.1 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LAB	ORAT	ORY	DATA	4		≻Ö		Z /	-				
NOTES	DЕРТН	E ERY					ĒL	JIMIT	YTK	RE \T %	RATOR	/ <u>ĕ</u>	SUAL	2 <u>2</u> 5 5	BOL	CLASSIFICATION AND		
	DE	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVALION	SYMBOL	PHYSICAL CONDITION		
			7.4	1.8	9.2	90.8	0.0	NP	NP	22.8	SP-SM		SP		6 p s	0.5 to 21.9 ft.: <u>SILTY SAND, SM</u> : About 5% fine sand; about 35% fines with low lasticity, no dry strength; maximum size: fin and; moist, olive brown; micaceous, noderately firm.		
	_	92										116.8	116.	8	S si m w fii	1.9 to 28.1 ft.: POORLY GRADED SAND, P: About 95% fine to coarse, hard, ubrounded sand; about 5% to trace fines; naximum size: coarse sand; wet, olive brow ith black oxidation; loose to moderately sof nely stratified with a greater percentage of		
	-												CL/ML 116.	6		nes from 24.1 to 28.1 ft. 8.1 to 29.1 ft.: SILTY SAND, SM: About		
													SP/SM	8	8 m b	5.7 tipe sand; about 15% nonplastic fines; naximum size: fine sand; moist to wet, olive rown; homogenous; firm; lightly cemented ens.		
	15 												(CL)s		; p si	9.1 to 30.6 ft.: SANDY LEAN CLAY, s(CL About 55% fines with low to medium lasticity; about 45 % fine sand; maximum ize: fine sand; moist, olive brown; firm.		
	-														8	0.6 to 33.5 ft.: SILTY SAND, SM: About 5% fine sand; about 15% nonplastic fines;		
		100											114.	4	b	naximum size: fine sand; moist to wet, olive rown; homogenous; firm, lightly cemented ens.		
			-	100											SP/SM		- 7 sa	3.5 to 34.1 ft.: <u>SAND CLAY, s(CL)</u> : About 0% fines with low plasticity; about 30% fine and; maximum size: fine sand; moist, olive rown; moderately soft.
													113.	0	Т	.D. = 34.1 ft.		
	_		39.6	7.5	47.1	52.9	0.0	NP	NP	16.7	SM	111.6	SM	c	al –			
	20												Sivi					
	20-														-			
													110.	2				
													SM					
		94																
	_												108.	8	-			
	+												SP		-			
								•										
COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile		O.D. = G.S. = b.g.s. T.O.C SJR =	= Gro = Bel : = To	und so low th op of v	urface e grou vell ca	und su asing	rface				Completion	on Dia	agram. Well de	evelo	oment ir	attached Well Information is elopment form. RECLAMATION Managing Water in the Wes		



FEATURE: Groundwater Monitoring

LOCATION: Reach 3. Left Side of River. Near Oxalis Ave.

BEGUN: 3/19/10 FINISHED: 3/19/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,224,164.6 E 6,127,385.3 (NAGD83)

TOTAL DEPTH: 34.1 ft.

STATE: California GROUND SURFACE ELEVATION: 130.7 ft. (NAVD88)

T.O.C ELEVATION: 133.1 ft. (NAVD88) HOLE LOGGED BY: A. Warren

REVIEWED BY: J. Vauk

LABORATORY DATA VISUAL CLASSIFICATION Ę **CLASSIFICATION AND** MOISTURE CONTENT % DEPTH LIQUID LIMIT PLASTICITY INDEX GEOLOGIC U SYMBOL % CORE RECOVERY ELEVATION ELEVATION **NOTES** % GRAVEL % FINES PHYSICAL CONDITION % CLAY % SAND % SILT SP 25 36 102.6 SM 101.6 Qal s(CL) 30. 100.1 100 SM 98.2 s(CL) 96.6 BOTTOM OF HOLE

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery

NA = Not applicable

I.D. = inner diameter RM = River Mile

O.D. = outer diameter

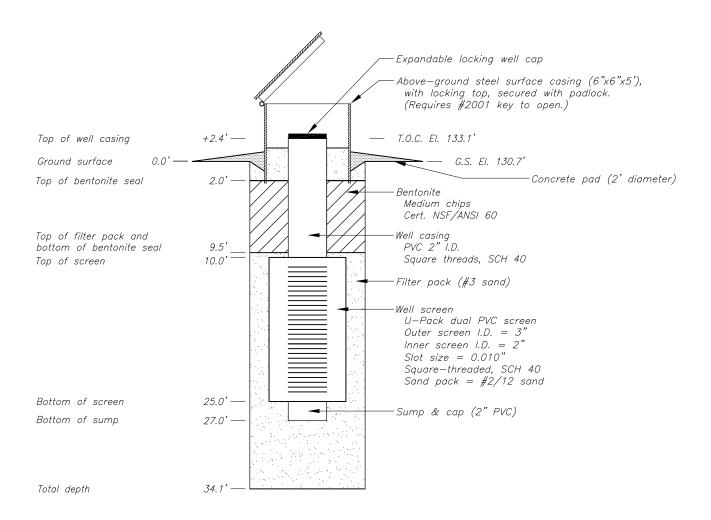
G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.



MW-10-76	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 3/19/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2224164.6 E6127385.3 (NAD83) ELEVATION 133.1' (NAVD88)
GROUND SURFACE ELEVATION 130.7' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

FEATURE: Groundwater Monitoring

PROJECT: San Joaquin River Restoration Program

LOCATION: Reach 3, Right Side of River, South of Sack Dam

COORDINATES: N 2,243,902.1 E 6,124,200.9 (NAGD83)

BEGUN: 3/23/10 FINISHED: 3/23/10 TOTAL DEPTH: 31.3 ft.

WATER LEVEL DEPTH AND ELEVATION: $\,$ 6.8 ft. b.g.s $\,$ (El. 118.5 ft.)

DATE WATER LEVEL WAS MEASURED: 3/23/2010

STATE: California

GROUND SURFACE ELEVATION: 125.3 ft. (NAVD88)

T.O.C ELEVATION: 127.8 ft. (NAVD88) HOLE LOGGED BY: A. Warren

REVIEWED BY: J. Vauk

						LABO	ORAT	ORY	DATA	4		≻O	\overline{T}	z /	T		
	NOTEO	Ŧ							TIV	≥	%	CATIC	/ z	CATIC	z 2	7	CLASSIFICATION AND
	NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION GEOLOGIC	SYMBOL	PHYSICAL CONDITION
	ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.											/		/			0.0 to 31.3 feet QUATERNARY ALLUVIUM (Qal)
	PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_												SM			0.0 to 1.9 ft.: <u>SILTY SAND, SM</u> : About 55 % fine, micaceous sand; about 45 % nonplastic fines; maximum size: fine sand; moist, brown, organic odor; moderately firm; many roots and organic materials present.
	LOCATION: Reach 3, RM 182, river right, about 480 feet east from the center of the SJR, about 1,000 feet east (across the SJR) from the end of Valeria	_	76											123	4		1.9 to 3.7 ft.: FAT CLAY, CH: About 95 % fines with high plasticity, toughness and dry strength, no dilatancy; about 5 % fine sand; maximum size: fine sand; moist, dark brown; very firm, homogenous.
	Avenue. DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper	_												СН			3.7 to 5.1 ft.: FAT CLAY WITH SAND, (CH)s: About 80 % fines with high plasticity, toughness and dry strength, no dilatancy; about 20 % fine sand with mica; maximum size: fine sand; moist, dark brown; moderately firm.
	Ken Kreitz, Helper DRILL RIG: Central Mining Equipment 75 drill rig (CME-75)	_												121	6		5.1 to 6.1 ft.: SANDY SILT, (ML)s: About 75% fines with no to low plasticity; about 25 % fine sand with mica; maximum size: fine sand; moist, olive brown with reddish brown layers; firm.
	DRILLING & SAMPLING METHODS: Drill hole MW-10-78 was advanced													(CH)s			Laboratory Data Interval 5.1 to 6.1 ft.
	using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground surface to a total depth of 31.3 feet.	5—												120	2	-	6.1 to 6.8 ft.: <u>SILTY SAND, SM</u> : About 70 — % fine micaceous sand; about 30 % fines with no to low plasticity; maximum size: fine sand;
	FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel.			51.5	21.0	72.5	27.5	0.0	31.9	6.2	21.7	(ML)s		(ML)s			moist, olive brown with reddish brown layers; firm. 6.8 to 13.8 ft.: POORLY GRADED SAND
	Interval Method 0.0 to 31.3 ft FADC	_	70										119.2	119	2 C	al -	WITH SILT, SP/SM: About 90 % fine to medium sand; about 10 % nonplastic fines; maximum size: medium sand; wet, olive
	DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 8.8 ft. smooth drilling, soft		76									Ţ		SM 118	5		brown and gray with reddish brown oxidation; moderately firm, stratified; layer of medium sand from 10.1 to 10.2 ft.; roots encountered from 10.2 to 13.8 ft.
	8.8 to 13.8 ft. moderately soft, wet 13.8 to 23.8 ft. moderately soft, add water 23.8 to 31.3 ft. moderately firm	_													5		13.8 to 18.7 ft.: POORLY GRADED SAND, SP: About 95 % fine sand; about 5 % fines; maximum size: fine sand; wet, tan with
	CAVING CONDITIONS: None																reddish brown oxidation; moderately soft; homogenous.
	DRILL FLUID, RETURN AND COLOR:																Laboratory Data Interval 14.5 to 15.5 ft.
	0.0 to 13.8 ft. None 13.8 to 31.3 ft. Water, no return WATER LEVEL:																18.7 to 23.8 ft.: SANDY LEAN CLAY, s(CL) : About 65 % fines with medium plasticity; about 35 % fine sand; maximum size: fine - sand: moist. olive tan: firm: laver of SM (about
GPJ	Not measured REASON FOR HOLE	_															85 % fine sand; 15 % nonplastic fines from 22.5 to 23.0 ft).
SJRRP.G	TERMINATION: The hole was terminated upon successful completion to the target																<u>Laboratory Data Interval</u> 20.0 to 21.0 ft.
CT DATABASE:	depth. HOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. El. 127.8 ft.)	10—												SP/SM			23.8 to 31.3 ft.: <u>POORLY GRADED SAND</u> , <u>SP</u> : About 95 % fine sand; about 5 % nonplastic fines; maximum size: fine sand; wet, olive tan; moderately firm to soft; stratified with lens of SP/SM.
PROJECT	Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 9.5 to 31.3 ft. (#3 Sand)	, -	78														Laboratory Data Interval 29.0 to 30.0 ft.
JLE	Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 9.5 ft. Well Completion: Steel surface																T.D. = 31.3 ft.
LL HOL	COMMENTS:																1

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter

RM = River Mile

O.D. = outer diameter

SJR = San Joaquin River

G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing

DATE: 9/15/2010 | SHEET 1 OF 3 | DRILL HOLE MW-10-77

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

RECLAMATION
Managing Water in the West

SHEET 2 OF 3

FEATURE: Groundwater Monitoring

PROJECT: San Joaquin River Restoration Program

LOCATION: Reach 3, Right Side of River, South of Sack Dam

COORDINATES: N 2,243,902.1 E 6,124,200.9 (NAGD83)

BEGUN: 3/23/10 FINISHED: 3/23/10 WATER LEVEL DEPTH AND ELEVATION: 6.8 ft. b.g.s (El. 118.5 ft.)

TOTAL DEPTH: 31.3 ft.

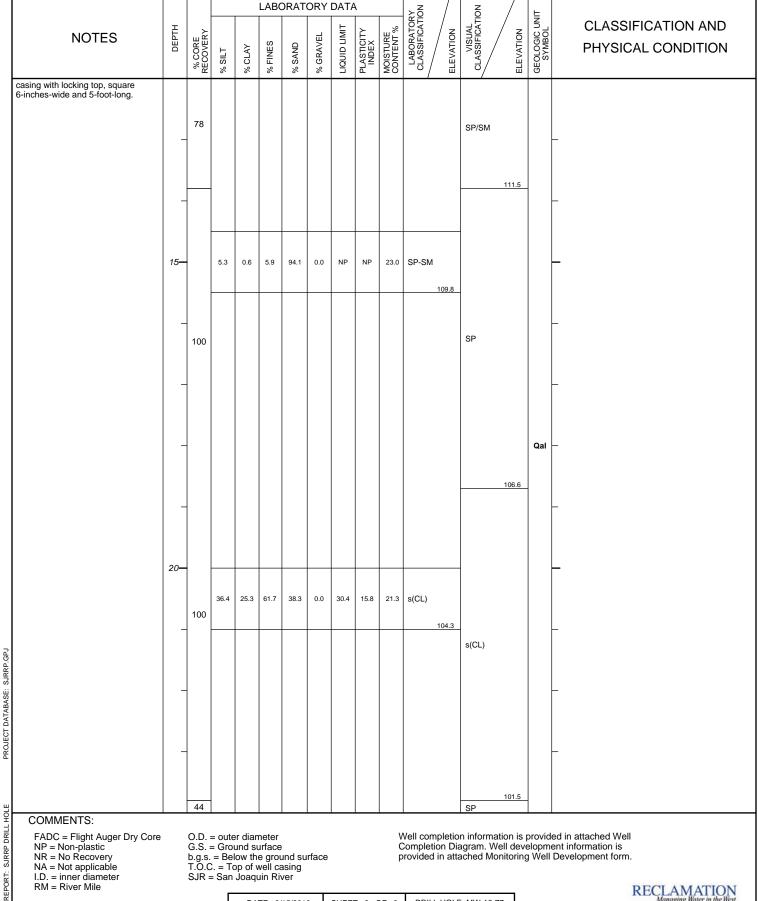
DATE WATER LEVEL WAS MEASURED: 3/23/2010

GROUND SURFACE ELEVATION: 125.3 ft. (NAVD88)

T.O.C ELEVATION: 127.8 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

STATE: California



COMMENTS:

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery

NA = Not applicable

I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

RECLAMATION
Managing Water in the West

SHEET 3 OF 3

FEATURE: Groundwater Monitoring

PROJECT: San Joaquin River Restoration Program

LOCATION: Reach 3, Right Side of River, South of Sack Dam BEGUN: 3/23/10 FINISHED: 3/23/10

COORDINATES: N 2,243,902.1 E 6,124,200.9 (NAGD83)

TOTAL DEPTH: 31.3 ft.

STATE: California

T.O.C ELEVATION: 127.8 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

GROUND SURFACE ELEVATION: 125.3 ft. (NAVD88)

CLASSIFICATION AND PHYSICAL CONDITION

WATER LEVEL DEPTH AND ELEVATION: 6.8 ft. b.g.s (El. 118.5 ft.)

DATE WATER LEVEL WAS MEASURED: 3/23/2010

					LABO	DRAT	ORY	DATA	4		≿Ö /	/	N O		⊨	
NOTES	DEPTH	% CORE RECOVERY	∆SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	
		44											SP		Qal	_
	30-	56	9.0	5.1	14.1	85.9	0.0	NP	NP	25.2	SM	5.3				_
	_						В	отто	M OF H	HOLE				94.0		

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing

SJR = San Joaquin River

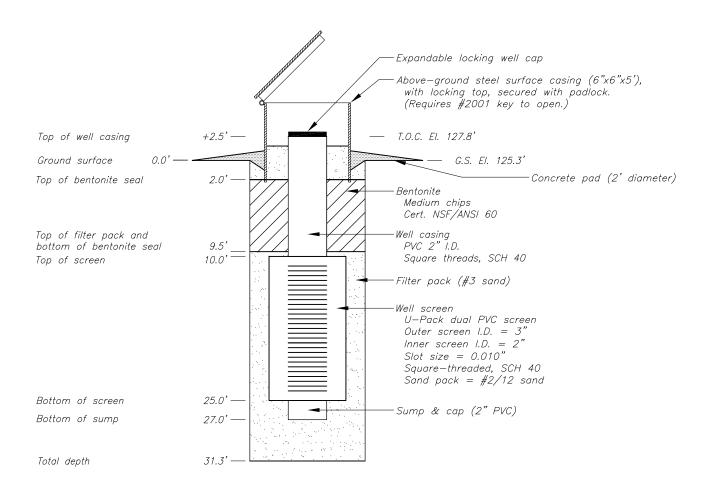
Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.



PROJECT DATABASE: SJRRP.GPJ

MW-10-78	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 3/23/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2243902.1 E6124200.9 (NAD83) ELEVATION 127.8' (NAVD88)
GROUND SURFACE ELEVATION 125.3' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/6/10 FINISHED: 12/6/10 DEPTH AND ELEVATION OF WATER LEVEL AND DATE MEASURED: Not Encountered PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,219,722.1 E 6,157,664.1 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 147.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	4	ORY TON		_	Je No	/	
NOTES	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE	_														0.0 to 31.1 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	-	100	23.8	35.7	40.5	0.0	25.7	2.3	19.6	s(ML)			s(ML)	1	O.0 to 3.6 ft. SANDY SILT, s(ML): About 60% fines with low plasticity, low toughness, low dry strength, slow dilatancy; about 40% fine sand; dry, brown to light brown; broken up from drilling activity; trace medium to coarse sand; hard; subrounded.
Reach 3, River Bank Right, Madera County, on Hemlock Rd. (Road 9), 3.9 miles north of the intersection of Road 9 and Avenue 7 1/2, on the east side of the road.	-										143.9			143.9	Lab Data Interval 0.0 to 3.6 ft.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller Chris Peterson, helper	-	_													 3.6 to 6.6 ft. SILTY SAND, SM: About 75% fine sand; about 25% fines with low plasticity, low toughness, low dry strength; dry, light brown to tan; broken up from drilling activity.
Dennis Read, helper DRILL RIG: Truck mounted Central Mining Equipment (CME)	5-	92											SM		6.6 to 8.6 ft. SILT WITH SAND, (ML)s: About 80% fines with low plasticity, low toughness, low dry strength; about 20% fine
75 DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d.	-	- 32										-		140.9	sand; dry, tan to brown; soft to firm consistency; small areas of oxidation throughout.
by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core	_		16.9	61.1	22.0	0.0	19.3	1.2	17.9	(ML)s	138.9		(ML)s	138.9	Lab Data Interval 6.6 to 8.6 ft. 8.6 to 9.4 ft. SILTY SAND, SM: About 70% fine sand; about 30% fines with low
FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning	-										130.9		SM	138.1	plasticity, low toughness, medium dry strength; moist, tan; firm consistency; some oxidation; micaceous.
adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers.	10-														9.4 to 12.6 ft. POORLY GRADED SAND, SP: About 95% fine sand; about 5% fines; moist, reddish-brown (oxidation); loose consistency.
Interval Method 0.0 to 31.1 ft. FADC	-	80	2.1	5.7	92.1	0.1	NP	NP	5.4	SP-SN	M		SP		Lab Data Interval 9.4 to 12.6 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: None	-	_													- 12.6 to 13.6 ft. <u>NO RECOVERY</u>
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid	_	_									134.9		NR	134.9	13.6 to 14.6 ft. POORLY GRADED SAND, SP: About 95% fine sand; about 5% fines; moist, reddish-brown (oxidation); loose consistency.
WATER LEVEL FROM TOC: Not Encountered	_												SP	133.9	14.6 to 18.0 ft. <u>SILTY SAND, SM:</u> About 75% fine sand: about 15% fines with low
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15-	_												132.9	plasticity, low toughness, rapid dilatancy, no dry strength; moist, olive/tan; soft consistency.
HOLE COMPLETION: Well Casing: 0.5 to 15.1 ft. (2-inch blank PVC) Dual U-pack Screen: 15.1 to 30.1 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand	-	100										Qal	SM		18.0 to 19.0 ft. LEAN CLAY WITH SAND, (CL)s: About 85% fines with low plasticity, low toughness, slow dilatancy, low dry strength; about 15% fine sand; moist, tan/brown to gray/tan; soft consistency; some oxidation.
Filter Pack: 13.1 to 31.1 ft. (#3 Sand) Sump: 30.1 to 31.1 ft. (2-inch blank PVC with slip cap)															Lab Data Interval 18.0 to 18.6 ft,
Bentonite Seal: 2.0 to 13.1 ft. Concrete Seal: 0.0 to 2.0 ft. (backfilled with #3 Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot	-	<u> </u> 	16.1	68.9	15.0	0.0	27.9	2.7	28.0	(ML)s	128.9	-	(CL)s	129.5	 19.0 to 21.7 ft. <u>SILTY SAND, SM</u>: About 85% fine sand; about 15% non plastic fines, no toughness, low dry strength; moist, brown to tan/brown; oxidation throughout.
diameter concrete pad. Lock: #2001 Masterlock															Lab Data Interval 19.0 to 21.7 ft.

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-117

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/6/10 FINISHED: 12/6/10
DEPTH AND ELEVATION OF WATER LEVEL
AND DATE MEASURED: Not Encountered

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,219,722.1 E 6,157,664.1 NAD83

TOTAL DEPTH: 31.1 ft.

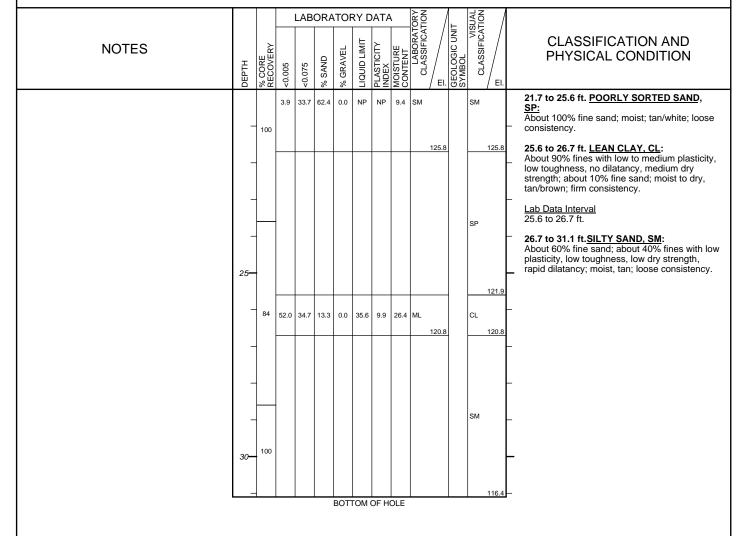
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 147.5 ft. NADV88
ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: G. Perea
REVIEWED BY: S. Dalton



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

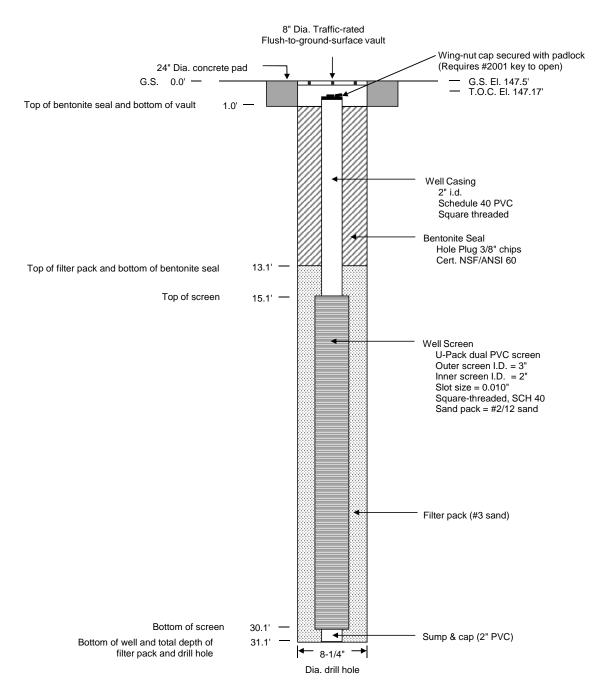
San Joaquin River Restoration Program U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name County Name	Well Name (DERA MW-10-117
Facility License, Permit or Monitoring Number County Cod	de Wis. Unique Well Number DNR Well ID Number
1. Can this well be purged dry? 2. Well development method surged with bailer and bailed surged with block and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly Other	Before Development After Development 11. Depth to Water (from top of well casing) Date b. \(\frac{2}{m} \) ft. \(\frac{1}{m} \)
3. Time spent developing well 4. Depth of well (from top of well casisng) 1. It.	(Describe) (Describe)
5. Inside diameter of well2 in.	
6. Volume of water in filter pack and well casing gal.	
7. Volume of water removed from well gal.	Fill in if drilling fluids were used and well is at solid waste facility:
8. Volume of water added (if any) gal.	14. Total suspended mg/l mg/l solids
9. Source of water added	15. COD mg/l mg/l
10. Analysis performed on water added?	16. Well developed by: Name (first, last) and Firm First Name: Last Name:
17. Additional comments on development: WEIL WAS DRY A WEIL'S STILL OR	,
Name and Address of Facility Contact /Owner/Responsible Party First Last Name: Name:	I hereby certify that the above information is true and correct to the best of my knowledge.
Facility/Firm:	Signature:
Street:	Print Name:
City/State/Zip:	Firm:

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-117	GEOLOGIST: G. Perea								
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen								
DATE COMPLETED: 12/6/2010	HELPERS: D. Read & C. Peterson								
LOCATION: Hemlock Road									
T.O.C. COORDINATES: N2219722.12 E6157664.14 (NAD83) ELEVATION 147.17' (NAVD88)									
G S FI F\/ATION: 147.5' (NA\/D88)									



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/4/10 FINISHED: 12/4/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 13.59 ft. (124.7 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,212,737.6 E 6,139,182.6 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 138.3 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

NOTES	_	te /ERY		LAB					N. T. N.	LABORATORY CLASSIFICATION	TIMIT OF	SYMBOL	VISUAL	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLAST INDEX	MOISTURE	OLA /	EI.	SYMBO	JO EI.	0.0 to 31.1 ft.
THE GROUND SURFACE													(CL)s	QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	63											136.9 CH	0.0 to 1.4 ft. LEAN CLAY WITH SAND, (CL)s: About 75% fines with low plasticity, low toughness, low dry strength; about 25% fine sand; moist, brown to dark brown; broken up
Reach 3, River Bank Right, Madera County, on the east side of Avenue 5 ½, 1.1 miles north of the triple intersection of Road 5 ½, Ave. 9, and	_		28.2	56.0	15.8	0.0	32.5	10.8	21.9	(CL)s		,	135.4 (CL)s	from drilling activities. – 1.4 to 2.9 ft. FAT CLAY, CH: About 90% fines with medium plasticity,
Road 6. DRILLED BY: Bureau of Reclamation: PN Region drill crew:	-										34.5		134.5	medium toughness, medium to high dry strength; about 10% fine sand; moist, dark brown to brown; firm consistency.
Jerry Hansen, driller Dennis Read, helper	5—		15.7	45.4	38.9	0.0	NP	NP	20.8	s(ML)	3.3		s(ML)	2.9 to 3.8 ft. LEAN CLAY WITH SAND, (CL)s: About 85% fines with low plasticity, medium
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	-	71											132.5	toughness, medium dry strength; about 15% fine sand; moist, tan/brown; firm consistency.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers	_	/1											SP-SM 131.1	Lab Data Interval 2.9 to 3.8 ft.
by 4-1/4 lint.i.d. Indiow stell inght adugets equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the	-												NR 129.7	3.8 to 5.8 ft. SANDY SILT, s(ML): About 60% fines with low plasticity, low toughness, rapid dilatancy; about 40% fine sand; moist, dark tan; soft to loose consistency.
FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning	-												120.7	<u>Lab Data Interval</u> - 3.8 to 5.0 ft.
adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	10-													Note: 5.1 to 5.8 ft.: Slight increase in sand.
augers Interval Method 0.0 to 31.1 ft. FADC DRILLING CONDITIONS AND DRILLER'S	10-	70	1.1	5.4	93.0	0.5	NP	NP	5.1	SP-SM			SP-SM	5.8 to 14.8 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine to medium sand (predominately fine); about 10% fines; trace coarse sand, subrounded, hard; moist, light tan: loose consistency, micaceous.
COMMENTS: 0.0 to 3.8 ft Medium soft 18.6 to 23.6 ft Add water, catcher with nylon.	-									12	26.2		126.2	· · · · · · · · · · · · · · · · · · ·
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid	_												NR	<u>Lab Data Interval</u> 8.6 to 12.1 ft.
WATER LEVEL FROM TOC: 13.32 ft. on 12/11/10.	_										-	Ţ	124.7	Note: 8.6 to 12.1 ft.: Slight increase in medium sand.
REASON FOR HOLE TERMINATION:													SP-SM 123.5	12.1 to 13.6 ft.: No Recovery
The hole was terminated upon successful completion to the target depth.	15—											Qal	SW 122.7	13.6 to 14.8 ft.: Decrease in medium and coarse sand, slight increase in fines.
HOLE COMPLETION: Well Casing: 0.5 to 10.0 ft. (2-inch blank PVC) Dual U-pack Screen: 10.0 to 25.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand	-	40										uai .	122.1	14.8 to 20.2 ft. WELL GRADED SAND, SW: About 100% fine to coarse sand; trace fines; wet, tan/brown; loose consistency; subrounded, hard; micaceous; quartz rich.
Filter Pack: 8.0 to 27.0 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with slip	-												NR	- 15.6 to 18.6 ft.: <u>No Recovery</u>
cap) Bentonite Seal: 2.0 to 8.0 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 2.0 ft. (backfilled with #3 Sand inside well vault) Well Completion: 8-inch dia flush-mount traffic	-												119.7	20.2 to 20.6 ft. SANDY SILT, s(ML): About 70% non plastic fines, no toughness, rapid dilatancy; about 30% fine sand; wet, brown/gray; soft consistency.
vault secured with 2 5/16" hex bolts; 2-foot dia concrete pad. Lock: #2001 Masterlock	-												sw	_ 20.6 to 23.6 ft. <u>No Recovery</u>
3														

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-118

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/4/10 FINISHED: 12/4/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 13.59 ft. (124.7 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,212,737.6 E 6,139,182.6 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 138.3 ft. NADV88

SHEET 2 OF 2

ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	ORY		_	SUAL	Λ
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT	VISUAL	CLASSIFICATION AND PHYSICAL CONDITION
	-	40		32.4		0.4		15.2			<i>,</i>		11: s(ML) ₁ . NR	18.1 22.6 to 24.4 th DOODLY CRADED SAND
	25 	100	60.7	33.9	5.4	0.0	34.5	9.5	28.7		113.4		СН	13.4 10% fine sand; moist, olive/tan; firm consistency; oxidation layers. 26.7 to 28.6 ft. SILT, ML: About 100% non plastic fines with no toughness, rapid dilatancy; trace fine sand; moist, tan; oxidation layers; firm to very firm consistency. Lab Data Interval 26.7 to 28.6 ft. 28.6 to 31.1 ft. SILTY SAND, SM:
	30—	100				ВОТ	FOM (OF H	OLE		109.7		SM	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

San Joaquin River Restoration Program

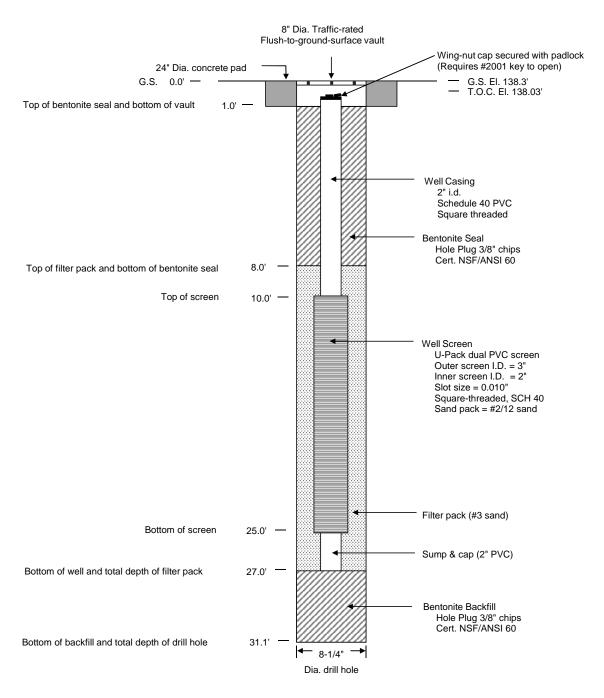
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	DERA	Well Name	10-1	1/8
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N		*	ell ID Number
surged with block and bailed surged with block and pumped surged with block, bailed and pumped	No No 141 61 42 62 70 20	11. Depth to Water (from top of well casing) Date	a	32 ft.	After Development $ \begin{array}{cccccccccccccccccccccccccccccccccc$
bailed only pumped only		12. Sediment in well bottom 13. Water clarity	Clear 1	_inches	Clear 20
3. Time spent developing well	22 min.		Turbid 2 1 (Describe)	5	Turbid☐ 2.5 (Describe)
	. Zn.		Sity Sa		
5. Inside diameter of well	<u>2</u> ∠ in.			1	
6. Volume of water in filter pack and well casing	gal.	Fill in if drilling flui	de were used as	d wall is	at solid waste facility:
7. Volume of water removed from wellS	SO gal.				
8. Volume of water added (if any)	gel	solids		mg/i	mg/l
9. Source of water added	-	15. COD			mg/l
10. Analysis performed on water added?	′cs □ No	16. Well developed by First Name: Firm:	by: Name (first, la	st) and Firm Last Nam	
17. Additional comments on development: 0850-0910 Bard Sgal 0911 0922 Pump 2	- Silty S	- D	my	y Al	en 5gals
Name and Address of Facility Contact/Owner/Responsib First Last Name: Name:	ole Party	I hereby certify the of my knowledge.	at the above infe	ormation i	s true and correct to the best
Facility/Firm:		Signature:			
Street:		Print Name:			
City/State/Zip:	4	Firm:			

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-118	GEOLOGIST: G. Perea								
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen								
DATE COMPLETED: 12/4/2010	HELPERS: D. Read								
LOCATION: Road 5 1/2									
T.O.C. COORDINATES: N2212737.56 E6139182.62 (NAD83) ELEVATION 138.03' (NAVD88)									
G S ELEVATION: 138 3' (NAV/D88)									



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/3/10 FINISHED: 12/3/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 11.09 ft. (129.4 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,206,697.0 E 6,139,043.9 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 140.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: G. Perea
REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA		JORY TION	-	TION	1
NOTES	DEРТН	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	гідиір сіміт	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION P	GEOLOGIC UNIT	VISUAL CLASSIFICATION III	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE													0.0 to 31.1 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	92										s(CL)	0.0 to 3.4 ft. SANDY LEAN CLAY, s(CL): About 70% fines with medium plasticity, medium toughness, no dilatancy; about 30% fine sand; dry, dark brown; broken up from drilling activities.
LOCATION: Reach 3, River Bank Right, Madera County, at the triple intersection of Road 5 ½, Ave. 9, and Road 6, on the northwest corner of the intersection.	-		45.5	22.1	32.4	0.0	45.7	27.2	19.6	s(CL)		137.1 SM 136.9	
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Jerry Hansen, driller	_											SP-SM 135.6	About 70% fine sand; about 30% fines with low plasticity, low toughness, rapid dilatancy; moist, tan/brown; soft to firm consistency.
Dennis Read, helper Tom Musial, helper DRILL RIG: Truck mounted Central Mining Equipment (CME)	5 -											SP	3.6 to 4.9 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% fines; moist, dark tan to light brown; loose consistency.
75 DRILLING & SAMPLING METHODS:		72										133.6	4.9 to 6.9 ft. POORLY GRADED SAND, SP: About 100% fine sand; trace fines; moist, light tan with salt and pepper; loose consistency.
The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core	_		1.0	4.2	94.8	0.0	NP	NP	4.3	SP-SM 133.1		SP 133.1	About 100% fine sand; moist, salt and pepper with large zones of oxidation; loose consistency.
system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot	-											131.9	Lab Data Interval 7.4 to 8.6 ft. No Recovery
beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	10-											NR	8.6 to 10.7 ft. No Recovery
augers Interval Method											Y	129.8	10.7 to 12.7 ft. POORLY GRADED SAND, SP: About 95% fine sand; about 5% fines; wet,
0.0 to 31.1 ft. FADC DRILLING CONDITIONS AND DRILLER'S		64									*	SP	light brown with oxidation; loose consistency; micaceous.
COMMENTS: 0.0 to 3.6 ft Medium soft 8.6 to 13.6 ft Add water and catcher 13.6 to 18.6 ft Catcher with bag	-											127.8	brown/gray to gray with oxidized layers;
18.6 to 23.6 ft Catcher with nylon DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid	_		1.6	6.4	92.0	0.0	NP	NP	32.5	SP-SM 126.9		SP-SM 126.9	micaceous. Lab Data Interval 12.7 to 13.6
WATER LEVEL FROM TOC: 10.88 ft. on 12/11/10.													13.6 to 18.6 ft. <u>No Recovery</u>
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15 -	0									Qal	NR	18.6 to 19.3 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% fines; wet, brown/gray to gray with oxidized layers; micaceous.
	_												19.3 to 31.1 ft. <u>No Recovery</u>
8/10/11 4:19:34	_	_										121.9	Note: 23.6 to 28.6 ft.: Trace recovery in sock: POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% fines; wet, brown/gray to gray with oxidized layers; micaceous.
	-											SP-SM 121.2	
7 2 1													

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-119

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/3/10 FINISHED: 12/3/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 11.09 ft. (129.4 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,206,697.0 E 6,139,043.9 NAD83

TOTAL DEPTH: 31.1 ft.

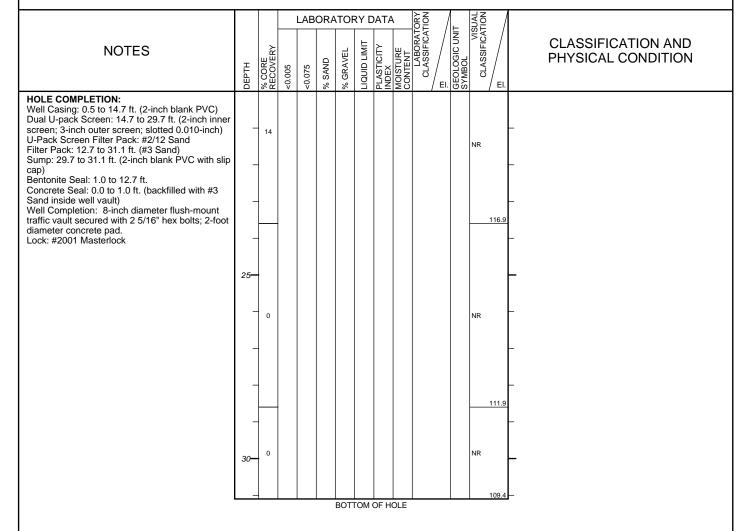
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 140.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton



COMMENTS:

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

San Joaquin River Restoration Program

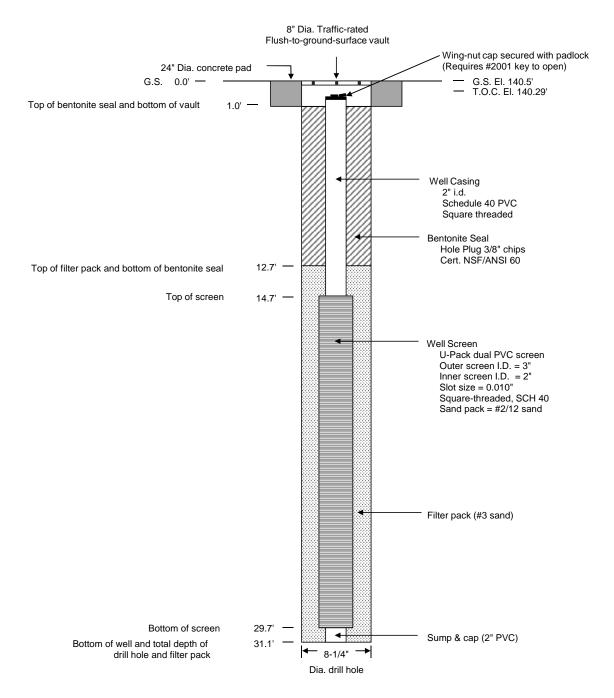
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	р Л	Well Name M40-10-/19					
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well No		DNR Well ID Number				
Faculty License, Permit or Monitoring Number	——	wis. Onique wen N						
1. Can this well be purged dry?	No 🔀	11. Depth to Water		elopment After Development				
2. Well development method		(from top of	a 10.	<u>881 11. D</u> n.				
	4 1	well casing)	Fla	54 Mount				
surged with bailer and pumped	6 1							
surged with block and bailed	4 2	Date	b.12/1/	$\frac{12010}{yyy}$ $\frac{12111}{yyy}$ $\frac{12012}{yyy}$				
surged with block and pumped	6 2		m m d d	yyyy mmddyyyy				
surged with block, bailed and pumped	7 0		40 00	2 p.m. 08:35 p.m.				
compressed air	2 0	Time	c. Q Q: 05	2 p.m. 0 : 25 p.m.				
	1 0		-0					
pumped only	51	12. Sediment in well	11.	inches				
	5 0	bottom	G1					
Other	24	13. Water clarity	Clear 1 Turbid 1	, 2				
2.77	2 ~		(Describe)	101010 23				
3. Time spent developing well	Miπ.		(Describe)	(Describe)				
4. Depth of well (from top of well casisng) _ 3), <u>3</u> ft.		July 9	ind clear				
5. Inside diameter of well	<u> </u>		Loc P					
6. Volume of Water in filter pack and well								
	gal.							
		Fill in if drilling fluid	is were used ar	nd well is at solid waste facility:				
7. Volume of water removed from well3C	2. Ogal.							
		14. Total suspended		mg/l mg/l				
8. Volume of water added (if any)	gal.	solids						
		16 000						
9. Source of water added		15. COD		mg/l mg/l				
		16. Well developed by						
10. Analysis performed on water added?	cs 🗆 No	First Name: I CR	ne	Last Name: Hansey				
(If yes, attach results)		1	(
17		Firm: BER						
17. Additional comments on development: 0805-0815 bail 59215 0816-0835 Pump 258	als STA	RTED ClEA	very c,	pAPTICE logals				
Name and Address of Facility Contact /Owner/Responsible	e Party	T						
First Last Name: Name:		I hereby certify that of my knowledge.	t the above inf	ormation is true and correct to the best				
Facility/Firm:		Signature:						
Street:		Print Name:						
City/State/Zip:		Firm:						

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-119	GEOLOGIST: G. Perea								
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen								
DATE COMPLETED: 12/3/2010	HELPERS: D. Read & T. Musial								
LOCATION: Ave 9, Road 6, and Road 5 1/2									
T.O.C. COORDINATES: N220669.97 E6139043.93 (NAD83) ELEVATION 140.29' (NAVD88)									
G S ELEVATION: 140.5' (NAV/D88)									



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Left, Fresno County

BEGUN: 12/1/10 FINISHED: 12/2/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 14.78 ft. (152.1 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,184,063.7 E 6,134,855.2 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 166.9 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA		JR√ ION		1.	UAL	<u> </u>	
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	CLASSIFICAL	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE													CL	·	0.0 to 31.1 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	100												165.6	O.0 to 1.3ft. LEAN CLAY, (CL): About 95% fines with low plasticity, medium toughness, no dilatancy; about 5% fine sand; dry, brown; broken up from drilling activities.
LOCATION: Reach 3, River Bank Left, Fresno County, on N Washoe Road, 0.2 miles north of the N Washoe Road and W Barstow Road intersection, on the west side of the road.	-												СН		1.3 to 4.1 ft. FAT CLAY, CH: About 100% fines with medium plasticity, medium to high toughness, no dilatancy; trace fine sand; dry, brown to light brown; firm consistency; somewhat broken up from drilling activities.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Jerry Hansen, driller Dennis Read, helper Tom Musial, helper	5 												Det	162.8 bris 162.0	Note: 4.1 to 4.9 ft.: Solid concrete debris, had water and gray to black material around it.
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	_	100	64.9	25.3	9.8	0.0	59.3	38.3	27.1	-	160.4				 4.9 to 8.6 ft. FAT CLAY, CH: About 95% fines with medium plasticity; medium to high toughness, high dry strength, no dilatancy: about 5% fine sand; moist, brown to light brown; firm consistency.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d.	-												СН		Lab Data Interval 5.6 to 6.5 ft.
by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the	-													158.3	8.6 to 12.2 ft. LEAN CLAY, CL: About 95% fines with low plasticity, low toughness; about 5% fine sand; moist, brown; soft consistency; decreasing moisture towards bottom.
FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	10-														Lab Data Interval 10.6 to 12.2 ft. 12.2 to 14.2 ft. LEAN CLAY, CL:
augers Interval Method 0.0 to 31.1 ft. FADC	_	100											CL		About 95% fines with low plasticity, low toughness, low to medium dry strength; about 5% fine sand; moist, brown to light brown; soft
DRILLING CONDITIONS AND DRILLER'S COMMENTS:	_		41.0	53.5	5.5	0.0	45.6	22.6	33.0		154.7			154.7	to firm consistency. 14.2 to 16.5 ft. <u>FAT CLAY, CH</u> : About 95% fines with high plasticity, high
0.0 to 31.1 ft Medium soft DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid	_														toughness, high dry strength; about 5% fine sand; moist, brown; soft consistency; broken up from drilling.
WATER LEVEL FROM TOC: 15.7 ft. on 12/10/10.													CL		<u>Lab Data Interval</u> 15.0 to 16.0 ft.
REASON FOR HOLE TERMINATION: The hole was terminated upon successful												Ī		152.7	16.5 to 18.6 ft. LEAN CLAY, CL: About 100% fines wiht medium plasticity, medium toughness, medium dry strength;
completion to the target depth. HOLE COMPLETION:	15—		58.8	39.0	2.2	0.0	56.2	31.8	37.8	СН		Qal	СН		 about 5% fine sand; moist, brown; firm consistency.
Well Casing: 0.5 to 18.0 ft. (2-inch blank PVC) Dual U-pack Screen: 18.0 to 28.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch)	-	100									150.9	-		150.4	18.6 to 20.6 ft. LEAN CLAY WITH SAND, (CL)s: About 85% fines with medium plasticity,
U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 16.0 to 31.1 ft. (#3 Sand) Sump: 28.0 to 31.1 ft. (2-inch blank PVC with slip	-														medium toughness; about 15% fine sand; wet, dark tan to brown; very soft consistency.
cap) Bentonite Seal: 1.0 to 16.0 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3	_											-	CL		<u>Lab Data Interval</u> 18.0 to 20.0 ft.
Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad.	_		56.5	27.7	15.8	0.0	47.4	28.3	30.9	(CL)s				148.3	-
Lock: #2001 Masterlock											146.9		(CL	.)s	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery
NA = Not applicable
I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-120

FEATURE: Groundwater Monitoring LOCATION: Reach 3, River Bank Left, Fresno County

BEGUN: 12/1/10 FINISHED: 12/2/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 14.78 ft. (152.1 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,184,063.7 E 6,134,855.2 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 166.9 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	OR√ TION	/ _	4		
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION III	GEOLOGIC UNIT	INIBOL VIO	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
	- - - 25—	90		V	6	6						s	146.3 	20.6 to 28.6 ft. SANDY SILT, s(ML): About 70% fines with low to medium plasticity, medium toughness; about 30% fine sand; moist, brown; firm consistency; gypsum veins and crystals throughout. 22.1 to 23.6 ft.:Increase in consistency. 23.6 to 25.2 ft.:No Recovery. 27.6 to 28.6 ft.:Slight increase in sand. 28.6 to 29.8 ft. SANDY LEAN CLAY, s(CL): About 85% fines with medium plasticity, medium toughness; about 15% fine sand; wet, brown; firm consistency. Lab Data Interval 28.6 to 29.0 ft. 29.8 to 31.1 ft. SANDY SILT, s(ML): About 70% plasticity fines with low to medium plasticity, medium toughness; about 30% fine sand; wet, brown to tan; firm consistency; gypsum veins and crystals throughout.
	30-	100	31.1	56.1		0.0 BOT	38.0			CL _{137.9}	9		138.3 CL 137.1 (ML) 135.8	- -

COMMENTS:

San Joaquin River Restoration Program

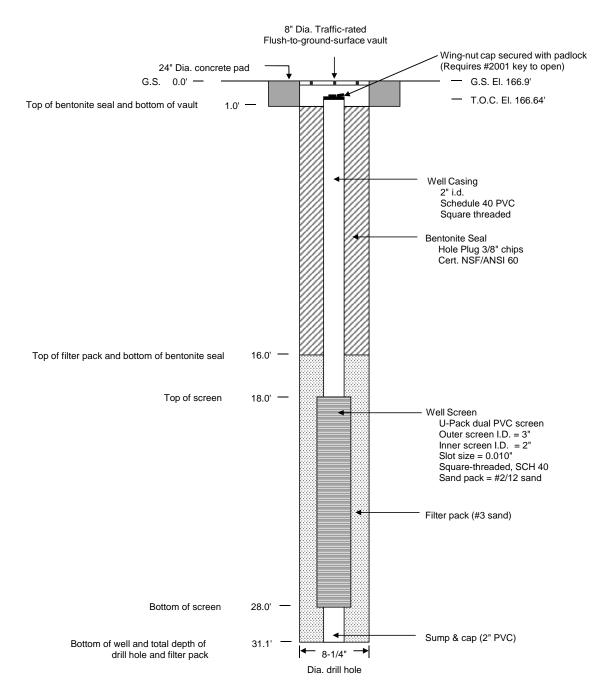
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name		
SJRRP	T.RES	120	Mu)-	10-1	2.0
Facility License, Permit or Monitoring Number	County Code				ID Number
1. Can this well be purged dry? Yes	No 🗌	II Death of Wood	Before Dev	elopment	After Development
2. Well development method		11. Depth to Water (from top of	. 15	7/ ft	26 43 6
surged with bailer and bailed 4	1	well casing)	Fly	Sh Ma	_26.43 ft.
1 11 1 1 1	1		, , - •	01/100	~~
	2	Date	. 12 . 10	11301	2 13.10.00
	2		m m d d	1 2 0 1	$\frac{\hat{C}}{y}$ $\frac{1}{m}$ $\frac{2}{m}$ $\frac{1}{d}$ $\frac{2}{d}$ $\frac{1}{y}$ $\frac{2}{y}$ $\frac{1}{y}$
	0				
compressed air	0	Time	. 14.52	→ 27 p.m.	1.524 grp.m.
bailed only					Z Z Z Z P.M.
pumped only	1	12. Sediment in well	TR	inches	IR _ inches
pumped slowly	0	bottom			meres
Other	Į.	13. Water clarity	Clear 📋 1	n 'i	Clear 20
	-	,	Turbid 1		Turbid 25
3. Time spent developing well _32	min		(Describe)		Describe)
			(1047)		osciloc)
4. Depth of well (from top of well casisng)	$\frac{2}{2}$ ft.				Stely Sono
,			0,000	74	200
5. Inside diameter of well	in.			-	
				_	
6. Volume of water in filter pack and well					
casing	eal			_	
	8=	Fill in if drilling fluid	ds were used an	d well is at	solid waste facility:
7. Volume of water removed from well 14	O gal.	l ta in ii diamig tion	S war asca an	G WCH IS AL	solid waste facility:
	. = 8	14 Total suspended		me/l	mg/l
8. Volume of water added (if any)	gal.	solids			mg/
	•				
9. Source of water added		15. COD		mg/l	mg/l
		16. Well developed b	y: Name (first, la	st) and Firm	
10. Analysis performed on water added?	□ No	First Name: 10	na	Last Names	Varon)
(If yes, attach results)		1	,	Cast Harrey	7-7-54-0
		Firm: 30	1		
17. Additional comments on development:		~ `			
1452-1508 bail sya	1 VERY	(bully			
772 300		5/2	15-1-11	5	
1511- 1517- Pump 75	al rum	sistery decel	127 (36	ally	
1517- 1522 LET SET KE	chance				
1522 - 1524 Pump 2941	,		() (
1822		(well is	VECT	Dec - 1	Vien Slav
Name and Address of Facility Contact /Owner/Responsible	Party		7	yen v	eng space
First Last	,		t the above info	rmation is t	rue and correct to the best
Name: Name:		of my knowledge.			
Facility/Firm:		Signature:			
_					
Street:		Print Name:			
City/State/Zip:		Firm:			

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-120	GEOLOGIST: G. Perea				
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen				
DATE COMPLETED: 12/2/2010	HELPERS: D. Read & T. Musial				
LOCATION: N Washoe Ave & W Barstow Ave					
T.O.C. COORDINATES: N2184063.74 E6134855.22 (NAD83) ELEVATION 166.64' (NAVD88)					
G.S. FLEVATION: 166.9' (NAVD88)					



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Left, Fresno County

BEGUN: 12/2/10 FINISHED: 12/2/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 17.76 ft. (132.6 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,189,548.4 E 6,143,359.3 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 150.4 ft. NADV88

ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

NOTES ALL MEASUREMENTS ARE IN FEET FROM THE GROWN SURFACE 10 10 10 10 10 10 10 1					LAB	ORA	TOF	RY D	ATA	١	ORY TON		_	UAL ION	<u> </u>	
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and insisted a ground-valed monitoring well to protein a ground-valed monitoring well to protein the first freework conditions and insisted and protein conditions and insisted and protein conditions and protein and protein the first freework conditions and protein and protein conditions and protein and protein conditions and protein and protein conditions and protein co	NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORAT CLASSIFICAT	EI.	GEOLOGIC UNIT	SIV		
PURPOSE OF HOLE: To recover orce, collect data to determine geologic and hydrologic site conditions, and mainly geologic mainl														CI		
Reach 3, River Bank Left, Fresen County, at the infersection of Sterra Avenue and HelmiCanal Road, on the west aide of Helmi Canal Road just route of the infersection. DRILLED BY: BUTCH ROAD STATE Agency and Helmic Canal Road just route of the infersection. DRILLED BY: DRILLING: Truck mounted Central Mining Equipment (CME) 765 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 Truck mounted Central Mining Equipment (CME) 775 DRILLING & SAMPLING METHODS. Truck mounted Central Mining Equipment (CME) 775 Truck mounted Central Mining Equipment	To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	89										-		148.9	About 80% fines with low plasticity, low toughness, low dry strength; about 20% fine sand; dry, dark tan to brown; broken up from
DRILLING CONDITIONS AND DRILLER'S COMMENTS: DRILLING CONDITIONS A	Reach 3, River Bank Left, Fresno County, at the intersection of Sierra Avenue and Helm Canal Road, on the west side of Helm Canal Road just	_	_	75.9	15.9	7.9	0.3	70.1	49.1	22.2		146.8				 About 90 to 95% fines with high plasticity, medium toughness, medium dry strength; about 5 to 10% fine sand; dry, dark brown to
Denix Read, helper Tom Musial, helper Tom Musial, helper DRILL Ric: Truck mounted Central Mining Equipment (CME) 75 DRILLING & SAMPLING METHODS: The dill hole was advanced using 6-1/4 inch o.d. The dill hole was advanced using 6-1/4 inch o.d. The dill hole was advanced using 6-1/4 inch o.d. The dill hole was advanced using 6-1/4 inch o.d. The dill hole was advanced using 6-1/4 inch o.d. The dill hole was advanced using 6-1/4 inch o.d. Date of the dill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-16 inch gs.ght barrel dry core system (FADC). Unless midicated otherwise, the cutting she of the FADC contained by the factor of the fade of	Bureau of Reclamation: PN Region drill crew:	-														consistency.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-14 inch o.d. by 4-14 inch i.d. hollow set milight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 5-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 5 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 5-3/8 inch i.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the FADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the fADC. Sampling was performed by advancing a 5 inch i.d. by 5 feet of the fADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the fADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the fADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the fADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the fADC. Sampling was performed by advancing a 4 inch o.d. by 5 feet of the fADC. Sampling was performed by 5 feet of the fADC. Sampling was performed by 5 feet of the fADC. Sampling was performed by 5 feet of the fADC. Sampling was performed by 5 fee	Dennis Read, helper	5—														
PRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch d.b. by 4-1/4 inch i.d. bollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long spit barred by ozore system (FADC). Unless indicated otherwise, the cutting shoe of the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC, so that the FADC did not rotate while advancing the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC extended 0.2 too the FADC extended 0.2 too the FADC, so that the FADC extended 0.2 too the FADC exten	Truck mounted Central Mining Equipment (CME)	_	100													10.0 to 11.0 ft.
drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 into 0.d. by 5.78 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the cutting shoe of the FADC sended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC so that the FADC did not rotate while advancing the augers. Interval Method On to 31.1 ft. FADC PRILLING CONDITIONS AND DRILLER'S COMMENTS: ON to 3.5 ft Soft 18.6 ft Soft 19.7 ft Thillied without fluid WATER LEVEL FROM TOC: 17.3 ft. on 12/10/10. The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Usual U-pack Screen: 14.6 ft. 29.6 ft. (2-inch inner screen; shicted 0.010-inch) U-pack Screen Filter Pack: 12.6 to 31.1 ft. (18) Sand) Sand Streen: 14.6 ft. 29.6 ft. (2-inch blank PVC) Well Casing: 0.5 to 14.6 ft. (2-in	DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers	_	-											СН		About 95% fines with medium plasticity, medium toughness, medium dry strength; about 5% fine sand; dry, tan; gypsum present;
beyond the auger dill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC, so that the FADC did not rotate while advancing the augers and placed at the top of the FADC did not rotate while advancing the augers and placed at the following space of the fines with low placed at the FADC did not rotate while advancing the augers and placed at the FADC did not rotate strengt, so did at the FADC did not rotate strengt, so did at the FADC did not rotate strengt, so did at the FADC did not rotate strengt, so did at the FADC did not rotate strengt, so did not rota	drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the	_														About 100% fines with high plasticity, high toughness, medium to high dry strength; trace fine sand; moist, tan to olive/brown; decrease
Interval Method Ol to 3.1 ft. FADC PRILLING CONDITIONS AND DRILLER'S COMMENTS: 18.6 to 23.6 ft Soft 18.6 to 23.6 ft Medium soft PRILLING FLUID, RETURN AND COLOR: Ol to 3.6 ft Soft 18.6 to 23.6 ft Medium soft PRILLING FLUID, RETURN AND COLOR: Ol to 3.6 ft Soft 18.6 to 23.6 ft Medium soft WATER LEVEL FROM TOC: 17.3 ft. on 12/10/10. REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 18.6 to 29.6 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen: Filter Pack: #2/12 Sand Filt	beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	10-	-	76.3	18.6	5.1	0.0	88.3	61.0	28.6	СН		-			About 100% fines with low plasticity, low toughness, no dilatancy, medium to high dry strength; moist, tan; firm consistency; gypsum
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.6 ft Soft 18.6 to 23.6 ft Medium soft DRILLING FLUID, RETURN AND COLOR: 0.0 to 3.1 ft Drilled without fluid WATER LEVEL FROM TOC: 17.3 ft. on 12/10/10. REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch blank PVC) Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand in side well vault) Well Campletion: 8-inch diameter flush-mount traffic vault secured with 2 5/16° hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock 13.8 Label A Biol 17.4 ft. SiLTY SAND, SM: About 85% fines and; About 15% fines; moist, red/brown to gray/tan marbled; soft consistency. 17.4 to 20.0 ft. SANDY SILT, s(ML): About 35% fines; about 65% fine sand; moist, gray/tan with oxidation zones; soft to firm consistency. 17.4 to 20.0 ft. SANDY SILT, s(ML): About 35% fines; about 65% fine sand; moist, gray/tan with oxidation zones; soft to firm consistency. 17.4 to 20.0 ft. SANDY SILT, s(ML): About 35% fines; about 65% fine sand; moist, gray/tan with oxidation zones; soft to firm consistency. 17.4 to 20.0 ft. SANDY SILT, s(ML): About 85% fines and; about 15% fines as and; moist, gray/tan with oxidation zones; soft to firm consistency. 20.1 to 21.4 ft. SILTY SAND, SM: About 85% fines and; about 15% fines with low plasticity, low toughness, rapid dilatancy; wet, dark tan; very soft consistency. 21.4 to 25.1 ft. SANDY SILT, s(ML): About 85% fines and; about 15% fines with low plasticity, low toughness, rapid dilatancy; about 20% fine sand; wet, gray to gray/blue; soft consistency.	Interval Method 0.0 to 31.1 ft. FADC	-	100									139.4				Lab Data Interval
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid WATER LEVEL FROM TOC: 17.31 ft. on 12/10/10. REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch inner screen; 3-inch outer scree	COMMENTS: 0.0 to 3.6 ft Soft	-	_											CI W		14.8 to 17.4 ft. SILTY SAND, SM: About 85% fine sand; About 15% fines; moist, red/brown to gray/tan marbled; soft
WATER LEVEL FROM TOC: 17.31 ft. on 12/10/10. REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: 12.10 to 12.6 ft.; 27.0 to 31.1 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. (2-inch blank PVC with slip cap) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock 43.1 50.3 6.6 0.0 45.8 25.1 31.9 CL 135.6 135.6 CL 135.6 CL 135.6 CL 135.6 CL 135.6 Lab Data Interval 17.4 to 18.6 ft. Note: 18.6 to 20.0 ft.:Wet, slight increase in fines. 20.0 to 21.4 ft. SILTY SAND, SM: About 85% fine sand; about 15% fines with low plasticity, low toughness, rapid dilatancy; wet, dark tan; very soft consistency. 21.4 to 25.1 ft. SANDY SILT, s(ML): About 80% non plastic fines with no toughness, rapid dilatancy; sout 20% fine sand; wet, gray to gray/blue; soft consistency.		-														17.4 to 20.0 ft. <u>SANDY SILT, s(ML)</u> :
The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch inner screen; 3-inch outer screen; solited 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 12.6 to 31.1 ft. (#3 Sand) Sump: 29.6 to 31.1 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock 15- 100 100 Note: 18.6 to 20.0 ft.:Wet, slight increase in fines. 20.0 to 21.4 ft. SILTY SAND, SM: About 85% fine sand; about 15% fines with low plasticity, low toughness, rapid dilatancy; wet, dark tan; very soft consistency. 21.4 to 25.1 ft. SANDY SILT, s(ML): About 80% non plastic fines with no toughness, rapid dilatancy; about 20% fine sand; wet, gray to gray/blue; soft consistency.		-		43.1	50.3	6.6	0.0	45.8	25.1	31.9	CL			CL		gray/tan with oxidation zones; soft to firm
HOLE COMPLETION: Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-pack Screen Filter Pack: #2/12 Sand Filter Pack: 12.6 to 31.1 ft. (43 Sand) Sump: 29.6 to 31.1 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock	The hole was terminated upon successful	15—										135.6			135.6	77.4 to 18.6 ft.
Filter Pack: 12.6 to 31.1 ft. (#3 Sand) Sump: 29.6 to 31.1 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock	Well Casing: 0.5 to 14.6 ft. (2-inch blank PVC) Dual U-pack Screen: 14.6 to 29.6 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch)	-	100										Qai			fines. 20.0 to 21.4 ft. SILTY SAND, SM: About 85% fine sand; about 15% fines with low
Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock	Filter Pack: 12.6 to 31.1 ft. (#3 Sand) Sump: 29.6 to 31.1 ft. (2-inch blank PVC with slip	-	1										•		133.0	dark tan; very soft consistency.
traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock	Bentonite Seal: 1.0 to 12.6 ft.; 27.0 to 31.1 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand inside well vault)	-		17.9	47.4	34.7	0.0	NP	NP	30.7	` '			s(MI	L)	About 80% non plastic fines with no toughness, rapid dilatancy; about 20% fine
COMMENTS:	traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock														130.4	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-121

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Left, Fresno County

BEGUN: 12/2/10 FINISHED: 12/2/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 17.76 ft. (132.6 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,189,548.4 E 6,143,359.3 NAD83

TOTAL DEPTH: 31.1 ft.

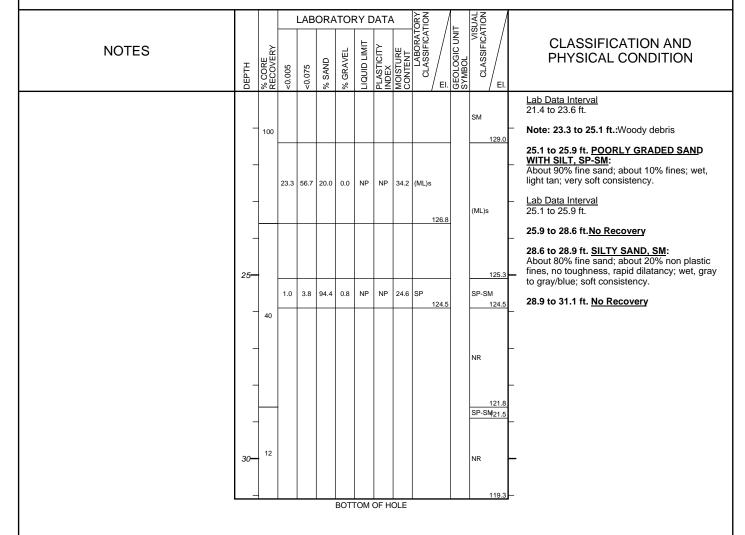
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 150.4 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

San Joaquin River Restoration Program

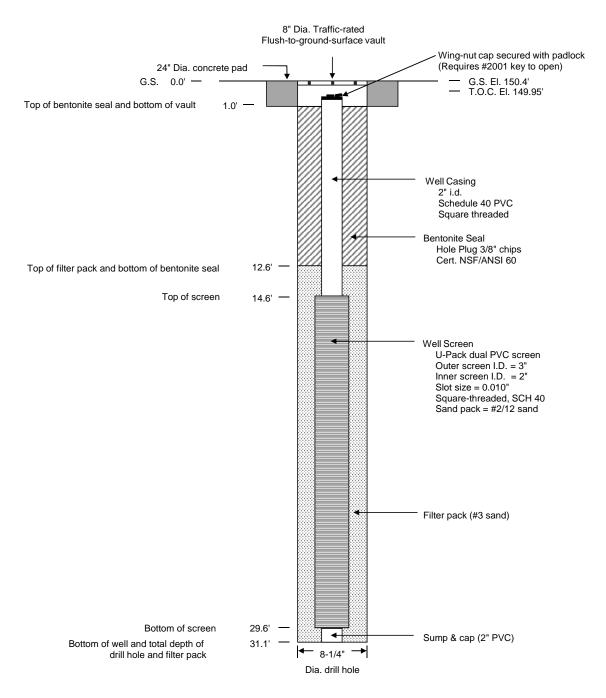
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name	
STORP	Commence	ESNO		-10-121
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N		DNR Well ID Number
1. Can this well be purged dry? Yes	No.	11. Depth to Water		relopment After Development
2. Well development method		(from top of		3/ft19.3/ft.
surged with bailer and bailed	4 1	well casing)	F/45	1. Moral
surged with bailer and pumped	61			11-10-4
	42	Date	- 17-110	120 12 12 10 1901
	62		m m d d	12010 /2/10/20/
	70			[101일 : HONGO STATE OF THE STA
compressed air	20	Time	c. 15:43	□ a.m. 2.03 p.m. □ p.m.
bailed only				
pumped only	51	12. Sediment in well	TR	inches inches
pumped slowly	5.0	bottom		
		13. Water clarity	Clear [] 1	Clear Z 20
	177.00		Turbid A 1	5 Turbid 25
3. Time spent developing well	2 min.		(Describe)	(Describe)
4. Depth of well (from top of well casisng) 25	2 . 7 ft.		Tent GR	CIERR
5. Inside diameter of well	in.			
6. Volume of water in filter pack and well				
casing	S Bal.			
7. Volume of water removed from well	 ○ gal. 	Fill in if drilling fluid	ds were used ar	nd well is at solid waste facility:
	, <u> </u>	14. Total suspended		mg/l mg/l
8. Volume of water added (if any)	gal.	solids		
9. Source of water added		15. COD		mg/lmg/l
		16. Well developed b	y: Name (first, la	ast) and Firm
10. Analysis performed on water added? (If yes, attach results)	cs 🗆 No	First Name: JEA	eny	Last Name: Hansen
17		Firm:		
17. Additional comments on development: 1542 - 1558 Ton Green 1600 - 1615 Premp 2	n Bools	sguls ETANTED (/EARIN	sup Alter Sgal
Name and Address of Facility Contact /Owner/Responsib	ole Party			
First Last Name: Name:		I hereby certify that of my knowledge.	t the above info	ormation is true and correct to the best
Facility/Firm:		Signature:		
Street:		Print Name:		
City/State/Zip:		Firm:		

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-121	GEOLOGIST: G. Perea				
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen				
DATE COMPLETED: 12/2/2010	HELPERS: D. Read & T. Musial				
LOCATION: Helm Canal Road and Sierra Ave					
T.O.C. COORDINATES: N2189548.42 E6143359.32 (NAD83) ELEVATION 149.95' (NAVD88)					
G.S. FLEVATION: 150.4' (NAVD88)					



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/5/10 FINISHED: 12/5/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 24.49 ft. (123.3 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,195,546.9 E 6,154,732.3 NAD83

TOTAL DEPTH: 31.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 147.8 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	АТА	١	ORY TON		L	TON		
NOTES	DEРТН	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE										,					0.0 to 31.2 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	_	86	41.1	36.6	22.3	0.0	43.3	19.7	21.9	(CL)s			(CL)s		O.0 to 3.1 ft. LEAN CLAY WITH SAND, (CL)s: About 85% fines with low to medium plasticity, low toughness, no dilatancy, low dry strength; about 15% fine sand with trace coarse sand; dry, brown; broken up from drilling activities.
Reach 3, River Bank Right, Madera County, on Road 8 ½, 0.5 miles south of the intersection of Avenue 7 ½ and Road 8 ½, on the east side of the road.	-										144.7		s(CL)	144.7 144.1	 <u>Lab Data Interval</u> 1.7 to 3.1 ft.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Jerry Hansen, driller Dennis Read, helper Chris Peterson, helper	5 												SM		About 55% fines with low plasticity, low toughnes; about 45% fine sand; dry, light brown; soft to firm consistency. 3.7 to 5.7 ft. SILTY SAND, SM:
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	_	62	2.3	8.0	89.7	0.0	NP	NP	5.6	SW-SI			SP-SI		About 80% fine sand; about 20% fines; moist, brown; loose consistency; increasing sand towards bottom.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was	-										141.2		NR	141.2	5.7 to 9.0 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% fines; dry, white/tan; loose consistency; oxidation layer at 6.4.
performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the	_												SP-SI	139.1 138.8	<u>Lab Data Interval</u> 5.7 to 6.6 ft. - 6.6 to 8.7 ft.: No Recovery
cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers Interval Method 0.0 to 31.2 ft. FADC	10-	66	0.6	4.7	94.2	0.5	NP	NP	4.8	SP-SN	Л		SP		9.0 to 15.3 ft. POORLY GRADED SAND, SP: About 95% fine to medium (predominately fine) sand; about 5% fines; trace coarse sand, subrounded, hard; moist, tan to tan/white; some oxidation; micaceous; alternating layers of fine/medium and fine sand throughout.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.7 ft Soft	_										135.8			135.8	<u>Lab Data Interval</u> — 9.0 to 12.0 ft.
3.7 to 8.7 ft Add Catcher 13.7 to 18.7 - Moderately soft	_												NR		12.0 to 13.7 ft.: <u>No Recovery</u> 15.3 to 16.7 ft. <u>POORLY GRADED SAND,</u>
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.2 ft Drilled without fluid WATER LEVEL FROM TOC: 24.24 ft. on 12/11/10.	_												SP	134.1	 <u>SP:</u> About 95% fine to medium (predominately fine) sand; about 5% fines; moist, white/ tan with some orange oxidation; loose consistency; two clay layers, each about 0.1 ft. thick.
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15 	72										Qal	SP	132.5	16.7 to 21.8 ft. SILTY SAND, SM: About 85% fine sand; about 15% fines; trace medium sand, subrounded, quartz rich; moist, white/tan; loose consistency; 0.1 ft. thick clay layer at 17.2 ft.
	_		2.6	13.1	84.2	0.1	NP	NP	9.0	SM	130.5		SM	131.1	<u>Lab Data Interval</u> 16.7 to 17.3 ft. 17.3 to 18.7 ft.:No Recovery
	_												NR	129.1	18.7 to 21.8 ft.:Layers with increased medium and coarse sand.
	_														

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-122

FEATURE: Groundwater Monitoring LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/5/10 FINISHED: 12/5/10

DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 24.49 ft. (123.3 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,195,546.9 E 6,154,732.3 NAD83

TOTAL DEPTH: 31.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 147.8 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

										≻z	7	T-	JZ /	
				LAB	ORA	TOF	Ι.			LABORATORY CLASSIFICATION	/ <u> </u>	VISIN	CLASSIFICATION	OLA COLFICATION AND
NOTES		E /ERY			۵	VEL	LIMIT	CITY	R F	ABOR	SGICL	٦	SSIFI	CLASSIFICATION AND PHYSICAL CONDITION
	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOIST	길 실 /티	GEOLOGIC UNIT	y MBC	ਹੋ / El.	
HOLE COMPLETION:		8.1	· ·	•					20		0 0.		SP	21.8 to 22.6 ft. POORLY GRADED SAND, SP:
Well Casing: 0.5 to 14.2 ft. (2-inch blank PVC) Dual U-pack Screen: 14.2 to 29.2 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch)	-	78												About 95% fine sand; about 5% fines; moist, tan/brown; loose consistency.
U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 12.2 to 31.2 ft. (#3 Sand)		/6											126.0	22.6 to 24.1 ft. No Recovery
Sump: 29.2 to 31.2 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 1.0 to 12.2 ft.; 27.0 to 31.1 ft.	-											s	SP 125.2	24.1 to 28.1 ft. <u>POORLY GRADED SAND</u> WITH SILT, SP-SM:
Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand inside well vault)	-											N	125.2	About 90% fine sand; about 10% fines; moist to wet, brown; oxidation layers.
Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad.													124.1	Lab Data Interval 24.1 to 28.1 ft.
Lock: #2001 Masterlock	-										_	H	NR 123.7	28.1 to 28.7 ft. <u>SILTY SAND, SM</u> :
	25-													About 70% fine sand; about 30% fines with low plasticity, low to medium toughness, slow dilatancy; moist, tan/olive; firm consistency; oxidation layers.
	-	92	0.6	5.4	94.0	0.0	NP	NP	29.3	SP-SM		s	SP-SM	28.7 to 29.8 ft. <u>POORLY GRADED SAND</u> WITH SILT, SP-SM:
	-	-												About 90% fine sand; about 10% fines; wet, tan/brown; soft consistency, oxidation layers from 29.5 to 29.8 ft.
														29.8 to 30.4 ft. POORLY GRADED SAND WITH SILT, SP-SM:
	_									119.		s	119.7 SM 119.1	About 90% fine sand; about 10% fines with low plasticity, low toughness; wet, brown; soft
	-											s	SP-SM	consistency.
												-	118.3	30.4 to 30.7 ft. LEAN TO FAT CLAY, CL/CH: About 95% fines with low to medium plasticity, low toughness, no dilatancy; about 5% fine
	30-	100											SP-SM 117.4 CL/CH _{17.1}	sand; moist, tan/olive with areas of oxidation; firm to very firm consistency.
						BOT	ГОМ (OF H	OLE			s	SM 116.6	About 85% fine sand; about 15% fines; moist,
						501	. OIVI	OI 11	JLL					red/brown; soft to loose consistency; oxidation layers.

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

San Joaquin River Restoration Program

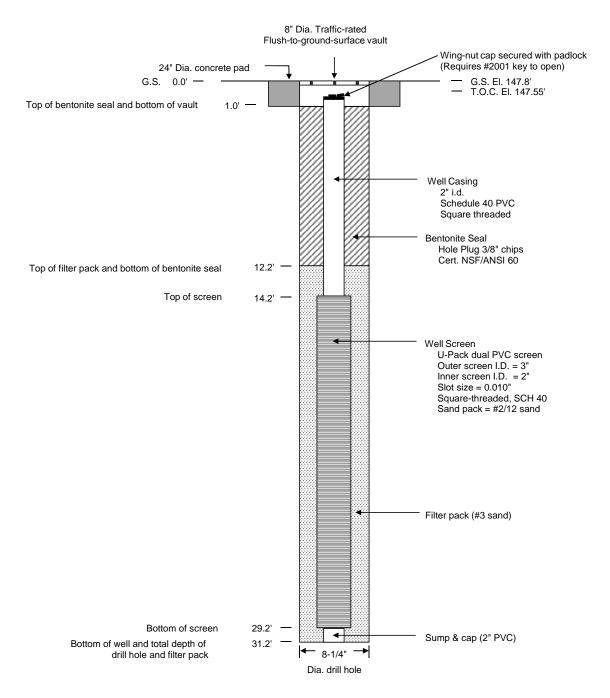
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	Well Nam	
STRRP	MADO	RA Mu)-10-122
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
1. Can this well be purged dry? Yes	No No	Before D	evelopment After Development
surged with bailer and pumped	4 1 6 1 4 2	(from top of well casing)	1.24 n24.48 n.
surged with block and pumped surged with block, bailed and pumped compressed air	62 70 20		$\frac{1}{d} \frac{20}{y} \frac{1}{y} \frac{0}{y} \frac{1}{y} \frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y}$ $\frac{1}{d} \frac{1}{y} \frac$
pumped only	1 0 5 1 5 0	12. Sediment in well bottom 13. Water clarity Clear	inchesinches
3. Time spent developing well	//min.	Turbid 🕏 (Describe)	15 Turbid□ 25
4. Depth of well (from top of well casisng) _ \$\frac{1}{2}\end{2}\$	2. 8 ft.	Tan	Sirty
5. Inside diameter of well	<u>2</u> in.		
6. Volume of water in filter pack and well casing		Fill in it deliting fluids were weed	and well is at solid waste facility:
7. Volume of water removed from well	S. Ogal.		mg/l mg/l
8. Volume of water added (if any)	gal.	solids	
9. Source of water added		15. COD	mg/l mg/l
10. Analysis performed on water added? (If yes, attach results)	cs 🗆 No		t, last) and Firm Last Name: (42)
17. Additional comments on development:		Firm:	
1037-1051 Day 159 1052 1115 Pump 2	al Ven	, Sithy with Fine	Sano
1052 1115 Pump 2	.Ogs1 (TEAR ACTER Sys	its Peny)
Name and Address of Facility Contact /Owner/Responsibl First Last Name: Name:	le Party	I hereby certify that the above i of my knowledge.	nformation is true and correct to the best
Facility/Firm:		Signature:	
Street:		Print Name:	
City/State/Zip:		Firm:	

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-122	GEOLOGIST: G. Perea									
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen									
DATE COMPLETED: 12/5/2010	HELPERS: D. Read & C. Peterson									
LOCATION: Road 8 1/2										
T.O.C. COORDINATES: N2195546.90 E6154732.31 (NAD83) ELEVATION 147.55' (NAVD88)										
G.S. ELEVATION: 147.8' (NAVD88)	, , ,									



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

#3 Sand backfills the well above the top of the bentonite seal.

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Left, Fresno County BEGUN: 11/30/10 FINISHED: 12/1/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 9.50 ft. (158.5 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,172,009.0 E 6,148,245.3 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 168.0 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	OR√ ION		L	ION ION		
NOTES	ОЕРТН	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY PLANT INDEX	MOISTURE CONTENT	LABORAT CLASSIFICA	EI.	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE															0.0 to 31.1 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	86	64.1	27.8	8.1	0.0	60.8	36.6	24.2		166.0		СН		 0.0 to 4.8 ft. FAT CLAY, CH: About 95% fines with high plasticity, medium toughness; about 5% fine sand; dry, dark brown to tan; CaCO3 veins throughout; broken up from drilling activities.
LOCATION: Reach 3, River Bank Left, Fresno County, on N	_	-											СП		Lab Data Interval – 0.0 to 2.0 ft.
Santa Fe Grade, 1.5 miles south of the intersection of N Santa Fe Grade and Ashlan Avenue.															<u>Lab Data Interval</u> 3.7 to 4.8 ft.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Jerry Hansen, driller Dennis Read, helper Tom Musial, helper	5—		70.1	25.7	4.2	0.0	66.1	42.2	36.1		163.2			163.2	4.8 to 6.8 ft. LEAN CLAY/FAT CLAY, CL/CH: About 95% fines with medium plasticity, low toughness; about 5% fine sand; dry to moist, light tan to tan; soft consistency.
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	_	100											CL/CI	H 161.2	6.8 to 8.6 ft. FAT CLAY, CH: About 100% fines with high plasticity, high toughness; trace fine sand; moist, brown to tan; firm consistency.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d.	-														Lab Data Interval 6.8 to 8.6 ft.
by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core	_	_	74.3	21.8	3.9	0.0	64.2	39.4	33.2		159.4		CH	159.4	8.6 to 10.3 ft. LEAN CLAY, CL: About 95% fines with medium to high plasticity, medium toughness; about 5% fine sand; moist, brown; soft consistency; broken up from drilling
system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so	10-		61.6	24.0	14.4	0.0	52.2	30.8	29.1		157.7	Ţ	02	157.7	 activities; CaCO3 veins. Lab Data Interval 8.6 to 10.3 ft.
that the FADC did not rotate while advancing the augers Interval Method 0.0 to 31.1 ft. FADC	_	100													10.3 to 13.3 ft. LEAN CLAY, CL: About 90% fines with medium plasticity, low toughness; about 10% fine sand; dry, tan to light brown; soft to firm consistency, CaCO3 nodules.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.7 ft Soft 18.6 to 23.6 ft Soft to moderately soft	_												CL		 13.3 to 13.9 ft. FAT CLAY, CH: About 100% fines with high plasticity, high toughness; trace fine sand; dry, tan to light brown; very firm consistency.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid													СН	154.7	13.9 to 14.7 ft. SANDY SILT, s(ML): About 60% fines with low plasticity, low to
WATER LEVEL FROM TOC: 9.35 ft. on 12/10/10.	-												s(ML)	153.3	 medium toughness; about 40% fine sand; moist, brown to tan; soft consistency.
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15—	100										Qal			 14.7 to 18.6 ft. FAT CLAY, CH: About 100% fines with high plasticity, high toughness, slow dilatancy; trace fine sand; wet, tan; very soft consistency.
	-		72.2	25.9	1.9	0.0	63.9	37.4	34 7	СН			СН		Lab Data Interval 16.3 to 17.3 ft.
	- _	100									150.7				 Note: 16.7 to 16.9 ft. and 17.1 to 17.3 ft.: Lens of SILTY SAND, SM: About 70% fine sand; about 30% fines with low plasticity, low toughness, slow dilatancy; wet.
														149.4	
	-														-

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-123

FEATURE: Groundwater Monitoring
LOCATION: Reach 3, River Bank Left, Fresno County

BEGUN: 11/30/10 FINISHED: 12/1/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 9.50 ft. (158.5 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,172,009.0 E 6,148,245.3 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 168.0 ft. NADV88

SHEET 2 OF 2

ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: G. Perea REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	SN I	/_	NAL	<u> </u>	
NOTES		E ÆRY			D	VEL	LIMIT	ICITY	URE	LABORATORY CLASSIFICATION	GEOLOGIC UNIT	VISI	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	гідиір гіміт	PLASTICITY INDEX	MOIST	O EI	GEOLC		D EI.	
HOLE COMPLETION: Well Casing: 0.5 to 15.5 ft. (2-inch blank PVC) Dual U-pack Screen: 15.5 to 30.5 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 13.0 to 31.1 ft. (#3 Sand) Sump: 29.2 to 31.2 ft. (2-inch blank PVC with slip cap)	-	100										Cł	н -	18.6 to 22.6 ft. FAT CLAY, CH: About 95% fines with high plasticity, high toughness, no dilatancy, high dry strength; about 5% fine sand; moist, light brown; firm to very firm consistency; CaCO3 nodules throughout; gradational contact with unit below.
Bentonite Seal: 1.0 to 13.0 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3												-	145.4	22.6 to 23.6 ft. <u>LEAN CLAY WITH SAND,</u> (CL)s:
Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot	-		30.5	53.1	16.4	0.0	37.4	15.4	32.8	(CL)s	ı	(C	CL)s 144.4	 About 85% fines with low plasticity, low toughness, rapid dilatancy; about 15% fine sand; moist, gray/green to gray/blue mottled; soft consistency.
diameter concrete pad. Lock: #2001 Masterlock	_											s(l	ML)	Lab Data Interval 22.6 to 23.6 ft.
	25 -	100										3(1	141.8	23.6 to 26.2 ft. SANDY SILT, s(ML): About 70% non plastic fines with low toughness, rapid dilatancy; about 30% fine sand; wet, gray/green mottled with red to brown; soft consistency.
	-	-										s(l	ML)	26.2 to 29.7 ft. SANDY SILT, s(ML): About 55% fines with low plasticity, no toughness; about 45% fine sand; moist, light brown; soft to firm consistency.
														Note: 28.6 to 29.7 ft.: Slight increase in sand and moisture.
	30-	100											138.3	 29.7 to 31.1 ft. <u>SILTY SAND, SM</u>: About 60% fine sand; about 40% non plastic fines with no toughness; wet, dark tan to light brown; soft consistency.
												SI	м	
	_												136.9	_
						BOTT	OM (OF HO	OLE					

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

San Joaquin River Restoration Program

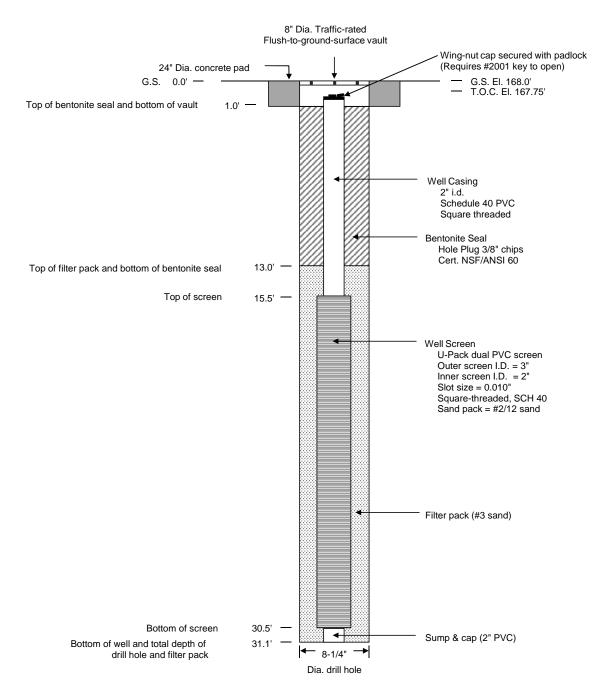
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

7000	Name Well Name
SJRRP	Très no MW-10-123
Facility License, Permit or Monitoring Number County C	Code Wis. Unique Well Number DNR Well ID Number
1. Can this well be purged dry? Yes No	111. Depth to water
2. Well development method	(from top of $a_1 = 125 ft. = 25.15 ft.$
surged with bailer and bailed 4 1	well casing) Hush Mount
surged with bailer and pumped 6 1	7.557.00
surged with block and bailed	Date 12/10/2010 12/10/2018
surged with block and pumped 6 2	Date $b.\frac{1}{2}\frac{1}{d}\frac{1}{d}\frac{20}{y}\frac{0}{y}\frac{1}{y}\frac{1}{m}\frac{10}{m}\frac{120}{d}\frac{0}{y}\frac{1}{y}\frac{1}{y}$
surged with block, bailed and pumped 70	
compressed air	Time c. 13:27 p.m. 14:26 p.m.
bailed only	
pumped only	12. Sediment in well TRinches inches
pumped slowly	bottom
Other	13. Water clarity Clear 10 Clear 20
	Turbid 15 Turbid 25
3. Time spent developing well	(Describe) (Describe)
4. Depth of well (from top of well casisng) 2.2. Lit.	Cloudy Cloudy
5. Inside diameter of well	Light Brown
6 Values of the said and said	
6. Volume of water in filter pack and well casing	
casing gal.	
7. Volume of water removed from well _69. Q gal.	Fill in if drilling fluids were used and well is at solid waste facility:
8. Volume of water added (if any) gal.	14. Total suspended mg/l mg/l solids
9. Source of water added	15. COD mg/l mg/l
	16. Well developed by: Name (first, last) and Firm
10. Analysis performed on water added? Yes N (If yes, attach results)	Firm: BOR Firm: BOR
17. Additional comments on development:	Firm: 8 S/C
1327-1334 Dail 55ab-Cloud	1412-1526 Dunp17gal Cloudy
	Cloudy- T/Cloudy 37 gals.
1352-1358 LET SET 1358-1407 Pump 10941 Stythe 1407-1412 LETSET	y Cheudy
Name and Address of Facility Contact/Owner/Responsible Party	I hereby certify that the above information is true and correct to the best
First Last Name: Name:	of my knowledge.
Facility/Firm:	Signature:
Street:	Print Name:
City/State/Zip:	Firm:

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-123	GEOLOGIST: G. Perea						
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen						
DATE COMPLETED: 12/1/2010	HELPERS: D. Read & T. Musial						
LOCATION: Santa Fe Grade							
T.O.C. COORDINATES: N2172009.04 E6148245.28 (NAD83) ELEVATION 167.75' (NAVD88)							
G.S. FLEVATION: 168 0' (NAVD88)							



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

#3 Sand backfills the well above the top of the bentonite seal.

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/7/10 FINISHED: 12/7/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 28.39 ft. (125.4 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,180,343.1 E 6,163,772.4 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 153.8 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

NOTES LABORATORY DATA CASSIFICATION AND PHYSICAL CONDITION	gh Sticity, d; dry ility.
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION: Reach 3, River Bank Right, Madera County, on the north side of Eastside Drive, 2.5 miles south of the intersection of Eastside Drive and Avenue 6. DRILLED BY: Bureau of Reclamation: PN Region drill crew: CH QUATERNARY ALLUVIUM - Qa 100 30.1 63.0 6.9 0.0 41.1 16.8 22.1 CL 100 30.1 63.0 6.9 0.0 41.1 16.8 22.1 CL 100 30.1 63.0 6.9 0.0 41.1 16.8 22.1 CL About 100% fines with low to medium pla medium toughness; about 20% fine san to moist, dark brown; soft consistency. CL 149.7 About 100% fines with low to medium pla medium toughness; about 20% fine san to moist, dark brown; soft consistency; soft consistency; so to 4.1 ft. LEAN CLAY, CL: About 100% fines with low to medium to ughness; race fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; low toughness; low toughness to low toughness the low toughness to low toughness the low toughness the low toughness to low toughness the low tou	gh Sticity, d; dry ility.
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION: Reach 3, River Bank Right, Madera County, on the north side of Eastside Drive, 2.5 miles south of the intersection of Eastside Drive and Avenue 6. DRILLED BY: Bureau of Reclamation: PN Region drill crew: CH QUATERNARY ALLUVIUM - Qa 100 30.1 63.0 6.9 0.0 41.1 16.8 22.1 CL 30.1 63.0 6.9 0.0 41.1 16.8 22.1 CL To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. 100 30.1 63.0 6.9 0.0 41.1 16.8 22.1 CL About 100% fines with low to medium pla medium toughness; about 20% fine san to moist, dark brown; soft consistency. 2.0 to 4.1 ft. LEAN CLAY, CL: About 100% fines with low to medium to moist, dark brown; soft consistency; soft consistency; soft consistency; soft consistency; so to moist and soft plant to moist, dark brown; soft consistency; so to with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; trace fine sand; dry, tan with low plasticity, low toughness; low toughness trace fine sand; dry, tan with low plasticity, low toughness trace fine sand; dry, tan with low plasticity, low toughness trace fine sand; dry, tan with low plasticity, low toughness trace fine sand; dry, tan with low plasticity, low toughness trace fine sand; dry, tan	gh _): sticity, d; dry ilty. slight
To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION: Reach 3, River Bank Right, Madera County, on the north side of Eastside Drive, 2.5 miles south of the intersection of Eastside Drive and Avenue 6. DRILLED BY: Bureau of Reclamation: PN Region drill crew: About 100% fines with high plasticity, hi toughness; moist, dark brown; very firm consistency. 0.7 to 2.0 ft. SANDY LEAN CLAY, SIC About 80% fines with low to medium pla medium toughness; about 20% fine san to moist, dark brown; soft consistency; such as the consistency of the intersection of Eastside Drive and Avenue 6.	_): sticity, d; dry ilty. slight
Reach 3, River Bank Right, Madera County, on the north side of Eastside Drive, 2.5 miles south of the intersection of Eastside Drive and Avenue 6. DRILLED BY: Bureau of Reclamation: PN Region drill crew: About 80% fines with low to medium plate medium toughness; about 20% fine sand to moist, dark brown; soft consistency; soft consis	sticity, d; dry ilty. slight
DRILLED BY: Bureau of Reclamation: PN Region drill crew:	
Chris Peterson, helper Dennis Read, helper 5—	
DRILL RIG: Truck mounted Central Mining Equipment (CME)	
75 A.1 to 5.7 ft. SILTY SAND, SM: About 65% fine sand; about 35% non pl fines; dry, tan; soft consistency; layered SP-SM SP-SM	
by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the	10% ark
FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	-
augers. 1.5 6.2 89.5 2.8 NP NP 3.9 SP-SM Note: 10.0 ft.: A 0.1 ft. band of fine, rour	ded,
DRILLING CONDITIONS AND DRILLER'S COMMENTS:	
8.6 to 13.6 ft Add catcher Note: 14.3 to 15.0 ft.:Moist; reddish brottraces coarse gravel, hard, rounded. DRILLING FLUID, RETURN AND COLOR:	<i>w</i> n;
0.0 to 31.1 ft Drilled without fluid WATER LEVEL FROM TOC: 15.0 to 16.3 ft. LEAN CLAY, CL: About 95% fines with low to medium pla about 5% fine sand; moist, tan; some la	ers of
28.02 ft. on 12/11/2010 REASON FOR HOLE TERMINATION: TABLE 1. A 2.11 TY CANE OF THE PROPERTY	er
The hole was terminated upon successful completion to the target depth. 15 HOLE COMPLETION: 16.3 to 18.8 ft. SILTY SAND, SM: About 60% fine sand; about 40% non pl fines; moist, tan; lightly cemented (breal weak finger pressure).	
Well Casing: 0.5 to 10.0 ft. (2-inch blank PVC) Dual U-pack Screen: 10.0 to 20.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-pack Screen Filter Pack: #2/12 Sand Filter Pack: 8.0 to 31.1 ft. (43 Sand) Sump: 20.0 to 31.1 ft. (2-inch blank PVC) Sump: 20.0 to 31.1 ft. (2-inch blank PVC) 137.5 **Weak Intiger plessure). **Weak Intiger plessure). **Weak Intiger plessure). **Basto 22.4 ft. SANDY SILT, s(ML): About 60% fines with low to medium ple about 40% fine sand; moist, tan; firm; C from 20.8 to 21.9 ft.; oxidation veinlets f	band
cap) Bentonite Seal: 1.0 to 8.0 ft. Concrete Seal: 0.0 to 1.0 ft. (backfilled with #3 Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot	
diameter concrete pad. Lock: #2001 Masterlock	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

GEOLOGIC LOG OF DRILL HOLE NO. MW-10-124

FEATURE: Groundwater Monitoring

LOCATION: Reach 3, River Bank Right, Madera County

BEGUN: 12/7/10 FINISHED: 12/7/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 28.39 ft. (125.4 ft. - 12/11/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,180,343.1 E 6,163,772.4 NAD83

TOTAL DEPTH: 31.1 ft.

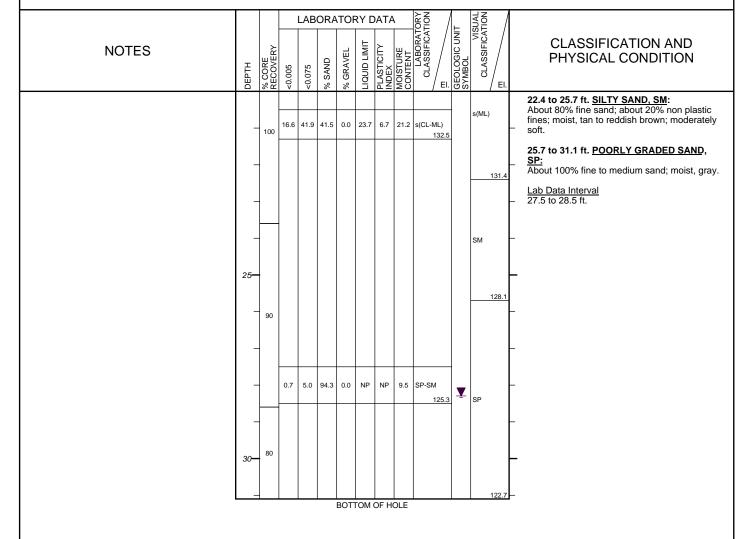
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 153.8 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton



COMMENTS:

NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

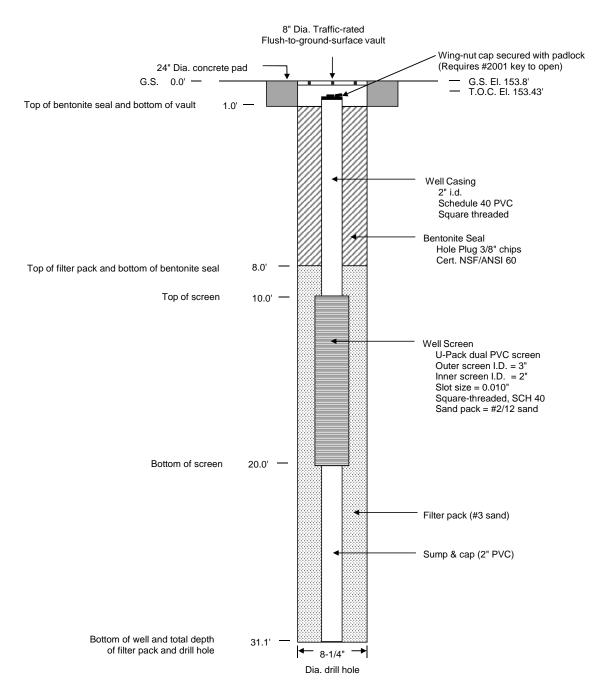
San Joaquin River Restoration Program
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	DERA	Well Name	10-124
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N		DNR Well ID Number
1. Can this well be purged dry? 2. Well development method surged with bailer and bailed surged with block and pumped surged with block and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly	No No 14 1 6 1 4 2 6 2 7 7 0 2 2 0 1 0 5 1 5 5 0	11. Depth to Water (from top of well casing) Date Time 12. Sediment in well bottom	Before Dev a 28, E/2 b/ 2/ _// _d d c/ _: 40	relopment After Development 2. 1/2 ft. 1/20/0/2/1/20/ y y y y m m d d y y y Xa.m. 2. 2/20/ p.m. / 2. 2/20/ inches
3. Time spent developing well 4. Depth of well (from top of well casisng)	3 min. 2, 21,	13. Water clarity	Clear 1 1 Turbid 1 1 (Describe)	5 Turbid ☐ 2.5 (Describe)
5. Inside diameter of well	<u>2</u> in.		Coup	y 1211
6. Volume of water in filter pack and well casing	gal.		***************************************	
7. Volume of water removed from well	_, gal.			d well is at solid waste facility:
8 Volume of water added (if any)	gal.	14. Total suspended solids		mg/l mg/l
9. Source of water added		15. COD		mg/l mg/l
10. Analysis performed on water added? (If yes, attach results)	es 🗆 No	16. Well developed by First Name: 27 Firm: BOR	y: Name (first, la	est) and Firm Last Name: Hansen
17. Additional comments on development: 1/46-1202-bar/ 1203 1220 Permys		Didy So		Ricy upAlter 284
Name and Address of Facility Contact /Owner/Responsible First Last Name: Name:	e Party	I hereby certify that of my knowledge.	t the above info	ormation is true and correct to the best
Facility/Firm:		Signature:		
Street:		Print Name:		
City/State/Zip:		Firm:		

NOTE: See instructions for more information including a list of county codes and well type codes.

MW-10-124	GEOLOGIST: G. Perea							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 12/7/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Eastside Drive								
T.O.C. COORDINATES: N2180343.08 E6163772.44 (NAD83) ELEVATION 153.43' (NAVD88)								
G.S. ELEVATION: 153.8' (NAVD88)								



*NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

#3 Sand backfills the well above the top of the bentonite seal.