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PREPARED FOR THE CITY OF MORRO BAY

WATER RECLAMATION FACILITY MASTER PLAN

B&V PROJECT NO. 189276 | NOVEMBER 2016

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9 NOVEMBER 2016



**Water Reclamation Facility Master Plan
Project No. 189276**

**Facility Master Plan
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Abbreviations and Acronyms

The following abbreviations and acronyms are used in this report:

AA	annual average
AACE	American Association of Cost Engineers
AADF	average annual daily flow
ac/hr	air changes per hour
ACoE	U.S. Army Corps of Engineers
ADC	alternative daily cover
ADMMF	average day maximum month flow
ADWF	average dry weather flow
AOB	ammonia oxidizing bacteria
AOP	advanced oxidation process
APCD	Air Pollution Control District
AS	activated sludge
ASTM	American Society for Testing and Materials
ATW	advanced treated water
ATWP	advanced treated water plant
AWP	advanced water purification
AWT	advanced water treatment
AX	anoxic
B&V	Black & Veatch Corporation
BAF	biological aerated filter
BFP	belt filter press
BMPs	best management practices
BNR	biological nutrient removal
BOD	biochemical oxygen demand
C	degrees Centigrade
CACO ₃	calcium carbonate
Caltrans	California Department of Transportation
CAM	California Title – 22 Metals
CCC	California Coastal Commission
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDP	Coastal Development Permit
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CIP	clean-in-place
City	City of Morro Bay
CIWMB	California Integrated Waste Management Board
CO ₂	carbon dioxide
COD	chemical oxygen demand
COLMR	Conditional Letter of Map Revision
County	County of San Luis Obispo
CPVC	chlorinated polyvinyl chloride



CSD	Cayucos Sanitary District
CT	contact time
CTR	California Toxic Rule
CWA	Clean Water Act
cy	cubic yards
DAFT	dissolved air flotation thickening
DDW	California Division of Drinking Water
DNB	denitrifying bacteria
DO	dissolved oxygen
DPR	direct potable reuse
DPR – ATW	DPR with advanced treated wastewater
DPR – FW	DPR with finished water
EAAS	extended aeration activated sludge
EBPR	enhanced biological phosphorus removal
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
EQ	exceptional quality
ESA	Environmental Site Assessment
F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FF	fixed film
FMP	Facility Master Plan
FOG	fats, oil, and grease
fps	feet per second
FRP	fiber reinforced plastic
FSEs	food service establishments
ft	feet
ft ₂	square feet
ft/sec	feet per second
gal	gallons
gal/ft ³	gallons per cubic foot
gfd	gallons per square foot per day
GHG	greenhouse gas
GIS	Geographical Information System
gpcd	gallons per capita per day
gph	gallons per hour
gpm	gallons per minute
gpm/ft ₂	gallons per minute per square foot
GTW	grease trap waste
GWR	Groundwater Rule
H ₂ O ₂	hydrogen peroxide
HCH	hexachlorocyclohexane
HDD	horizontal directional drilling
HDPE	high density polyethylene
HSW	high-strength waste
hp	horsepower



HRT	hydraulic retention time
I&I	inflow and infiltration
IFAS	integrated fixed film activated sludge
IPR	indirect potable reuse
ISC	Influent Scrubber Complex
IVCs	in-vessel composting systems
IWMA	Integrated Waste Management Authority
kW	kilowatt
kW-hr	kilowatt hour
lb/d	pounds per day
lb/gal	pounds per gallon
lbs	pounds
LF	linear feet
LOMR	Letter of Map Revision
MBBR	moving bed bioreactor
MBCSD	Morro Bay – Cayucos Sanitary District
MBR	membrane bioreactor
MCC	motor control center
MCL	maximum contaminant level
MDF	maximum day factor
MF	microfiltration
MF/RO	microfiltration/reverse osmosis
MF/UF	microfiltration/ultrafiltration
mgd	million gallons per day
MG/KG	milligrams per kilogram
mg/L	milligrams per liter
mg N/L	milligrams of nitrogen per
min/D	minimum day
ml/L	milliliters per liter
MLE	modified Lutzak-Ettinger
MLSS	mixed liquor suspended solids
MM	maximum month flow
mm	millimeters
MPN	most probable number
N/A	not available, not applicable
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
NTU	nephelometric turbidity unit
O&M	operations and maintenance
PC	primary clarifier
PC	processing cavity
PD	peak day
PDF	peak day flow
PF	peaking factor
PFDs	process flow diagrams
PFRP	Process to Further Reduce Pathogens



PHF	peak hour flow
PLC	programmable logic controller
PSDWF	peak seasonal dry weather flow
PSRP	Process to Significantly Reduce Pathogens
PU	process unit
RBCs	rotating biological contactors
RO	reverse osmosis
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SAR	sodium adsorption rate
SBR	sequencing batch reactor
SCADA	Supervisory Control and Data Acquisition System
scf/lb	standard cubic feet per pound
scfd	standard cubic feet per day
scfm	standard cubic feet per minute
SCSMPU	Sewer Collection System Master Plan Update
SLO	San Luis Obispo
SLOCOG	San Luis Obispo Council of Governments
SRT	solids retention time
SSC	Solids Scrubber Complex
SSMP	sanitary sewer master plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDH	total dynamic head
TDS	total dissolved solids
TF	trickling filter
THMs	trihalomethanes
Title 22	Title 22 of the California Code of Regulations
TKN	Total Kjeldahl Nitrogen
TM	technical memorandum
TMs	technical memoranda
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TS	total solids
TSS	total suspended solids
TUc	toxicity units chronic
UF	ultrafiltration
ug/L	micrograms per liter
UL	Underwriters Laboratory
um	micrograms per liter
UPS	uninterruptible power supply
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UV	ultraviolet light
UV/AOP	UV-mediated advanced oxidation



VFDs	variable frequency drive
VOCs	volatile organic compounds
VS	volatile solids
VSR/VSr	volatile solids reduction
WAS	waste activated sludge
WDR	waste discharge requirements
WEF	Water Environment Foundation
WRF	Proposed City of Morro Bay Water Reclamation Facility
WRFCAC	Water Reclamation Facility Citizens Advisory Committee
WRR	Whale Rock Reservoir
WTP	water treatment plant
WWTP	wastewater treatment plant