APPENDIX 5B

REVISED 2020 BASELINE CONDITION HARBOR SIPHON CAPACITY MEMORANDUM



| Date: | December 21, 2005 |
|----------|--|
| To: | Kate Ziino, HNTB |
| From: | Cari Roper, TN & Associates, David Perry, Brown and Caldwell |
| Subject: | Harbor Siphons Capacity for 2020 Baseline Conditions Gap Analysis – Results from 2020 Conveyance Model |

The 2020 Treatment Systems Team has requested the 2020 Conveyance Modeling Team to evaluate the capacity of the Harbor Siphons for the Future Conditions Gap Analysis. The evaluation was done using the 2020 Streamlined Conveyance model simulating the August 8-10, 1986 event, which has the largest volume of CSO for the 64-year record with 2020 Baseline conditions.

Future Conditions Streamlined Model

The Harbor Siphon improvement projects include rehabilitation or replacement of existing MIS sewers to increase the capacity of gravity flow to the Jones Island Waste Water Treatment Plant (JIWWTP). With the improvement projects in place, the Harbor Siphons will no longer be the capacity limitation for flow to the JIWWTP.

Instead capacity limitation to the treatment plant will be due to the JIWWTP Screw Pumps and/or the head-works to the screw pumps. The capacity of the low level screw pumps is approximately 140 MGD. The high level screw pumps have a capacity of 330 MGD. When the low level screw pumps are pumping 140 MGD, 190 MGD is left for pumping of high level flow.

Gap Analysis Model

In order to determine the capacity of the harbor siphons, the high and low level screw pumps are removed from the model. By removing the screw pumps downstream of the siphons, a significant flow restriction to JIWWTP is removed. However, removal of the flow restrictions from the screw pumps does not result in the siphons limiting flow alone. Other sources of flow limitations in conveyance to JIWWTP include intercepting structure capacities and head losses in the flow control chambers at the downstream end of the siphons and head losses in the head works upstream of the screw pumps. The flow limitations for the conveyance have not been removed from the model because it is unrealistic to do so. Any type of configuration of pumps or conveyance to JIWWTP would result in head losses close to the ones that presently exist in the conveyance system.

For the simulation of the August 6-10, 1986 event under 2020 Baseline conditions, some of the siphons are at capacity, while others are limited by hydraulic restrictions upstream of the siphons. The restrictions upstream are typically due to intercepting structure hydraulic capacities. At the time when the peak flow and maximum HGL in the siphons are occurring, CSO's are also occurring. The flow that could be routed to the treatment plant is being diverted to the NSC and to combined sewer outfalls by the MMSD Intercepting Structures. The intercepting structure capacities in the model are representative of the improvements that will occur as part of the Central MIS improvement projects.



TABLE 5B-1 SHEET 1 OF 2HARBOR SIPHONS CAPACITY FORFUTURE CONDITIONS GAP ANALYSIS2020 TREATMENT REPORT5/28/07TR_5B.T001.07.05.28.cdr

There are four siphons that convey flow from the low level system into a flow control chamber and four siphons that convey flow from the high level system into another flow control chamber. The head loss at the high level and low level flow control chambers is also a limiting factor on the flow. Additionally, flow downstream of the siphons is conveyed through the JIWWTP head works. The head works also restrict flow because they create head losses.

The peak flow through the siphons for the August 6-10, 1986 simulation are representative of the maximum amount of flow that would be conveyed through the siphons with the Central MIS Improvements, and Harbor Siphon Improvement projects in place. The flow is restricted by the harbor siphons capacity, head loss in the flow control chambers, head losses in the JIWWTP head works, and intercepting structure capacities. The results of the simulation show that the peak flow through the low level siphon is 565 cfs (365 MGD). For this simulation the high level siphon reached a peak flow of 363 cfs (234 MGD). The maximum HGL at the downstream end of the JIWWTP head works as represented in the model results is -5.03 feet and -20.57 feet for the high level and low level respectively.

[Post Memo Phone Conversation between Kate Ziino, HNTB and Cari Roper, TN, December 22, 2005: Cari Roper confirmed that review of the conveyance system model indicated that overflow elevations on overflows upstream of the harbor siphons control the hydraulic grade line such that the high and low level wet wells will not flood during future 2020 condition peak flows even when influent pumping reaches peak capacity.]



TABLE 5B-1 SHEET 2 OF 2HARBOR SIPHONS CAPACITY FORFUTURE CONDITIONS GAP ANALYSIS2020 TREATMENT REPORT5/28/07TR_5B.T001.07.05.28.cdr

APPENDIX 5C

MMSD SYSTEM REVISED 2020 BASELINE CONDITION MASS BALANCE ANALYSIS



- Mass Balance Schematics, including unit process design parameters and biosolids loading information, was developed from: MMSD, Jones Island Operations and Maintenance Manual: Plant Summary and Administration (1 July 1993). MMSD, South Shore Operation & Maintenance Manual : Plant Summary and Administration (1 March 1986). UWS, Daily/Weekly Operating Report (2003) [UWS DWOR] UWS, Monthly Reports (2003)
 2003 Mass Balance, developed from 2003 UWS DWOR and Monthly Report data — provided in 2020 Facilities Plan project files 2006 Mass Balance, developed from 2003 Mass Balance and 2006 influent estimates from reference listed in item #2 below — provided in 2020 Facilities Plan project files See Table 5C-8, Revised 2020 Baseline and Existing Data for additional sources
- 2) Influent Flow and Wasteload data was presented in Appendix 5A, *Future Condition Flow and Wasteload Analysis*, in Table 5A-1, Existing and Future Average and Peak Flows and Loads and Table 5A-7, Existing Condition Maximum Flow and Load Analysis
- 3) Uses for the Mass Balance Data:

| Average Condition Mass Balances: | Tables 5-8 & 5-10 Tables 5-9 & 5-11 Table 5-12 Table 5-13 Table 5-14 | JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations Milorganite® Processes — Revised 2020 Baseline Condition Agri-Life® Process — Revised 2020 Baseline Condition Interplant Solids Pumping — Revised 2020 Baseline Condition |
|---|--|--|
| Maximum Day Flow Mass Balances | | JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition |
| | Tables 5-9 & 5-11 | JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations |
| Peak Hour Flow Mass Balances | Used to determine h | ydraulic operations of wastewater treatment unit processes |
| | Tables 5-8 & 5-10 | JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition |
| | Tables 5-9 & 5-11 | JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations |
| Maximum Day Wasteload Mass Balances: | Used to determine w | asteloading on activated sludge process and operation of biosolids unit processes |
| | Tables 5-8 & 5-10 | JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition |
| | Tables 5-9 & 5-11 | JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations |
| | Table 5-12 | Milorganite® Processes — Revised 2020 Baseline Condition |
| | Table 5-13 | Agri-Life® Process — Revised 2020 Baseline Condition |
| | Table 5-14 | Interplant Solids Pumping — Revised 2020 Baseline Condition |
| Maximum Week & Month Wasteload Mass Balances: | Table 5-12 | Milorganite® Processes — Revised 2020 Baseline Condition |
| | Table 5-13 | Agri-Life® Process — Revised 2020 Baseline Condition |
| | Table 5-14 | Interplant Solids Pumping — Revised 2020 Baseline Condition |



TABLE 5C-1 **MASS BALANCE INFORMATION SUMMARY** 2020 TREATMENT REPORT 5/28/07 TR_5C.T001.07.05.28.cdr

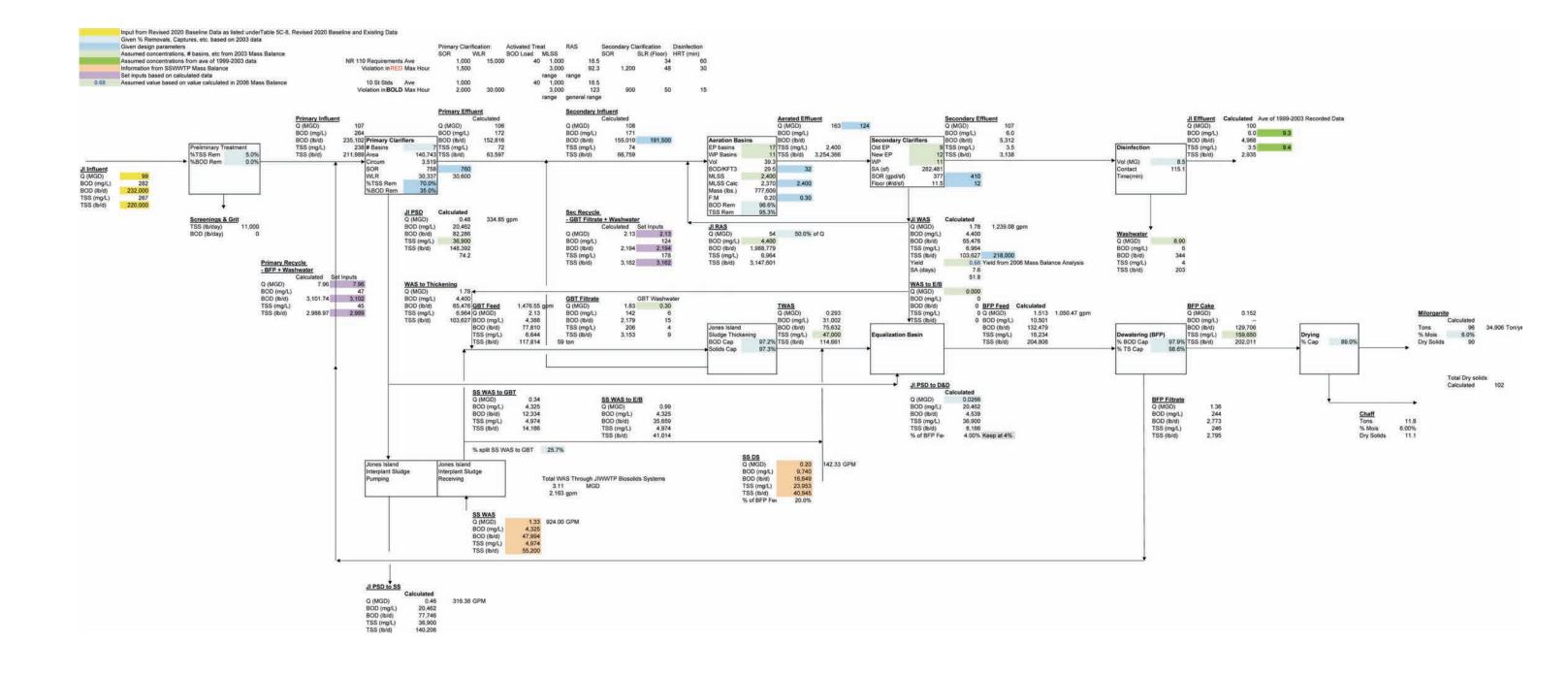
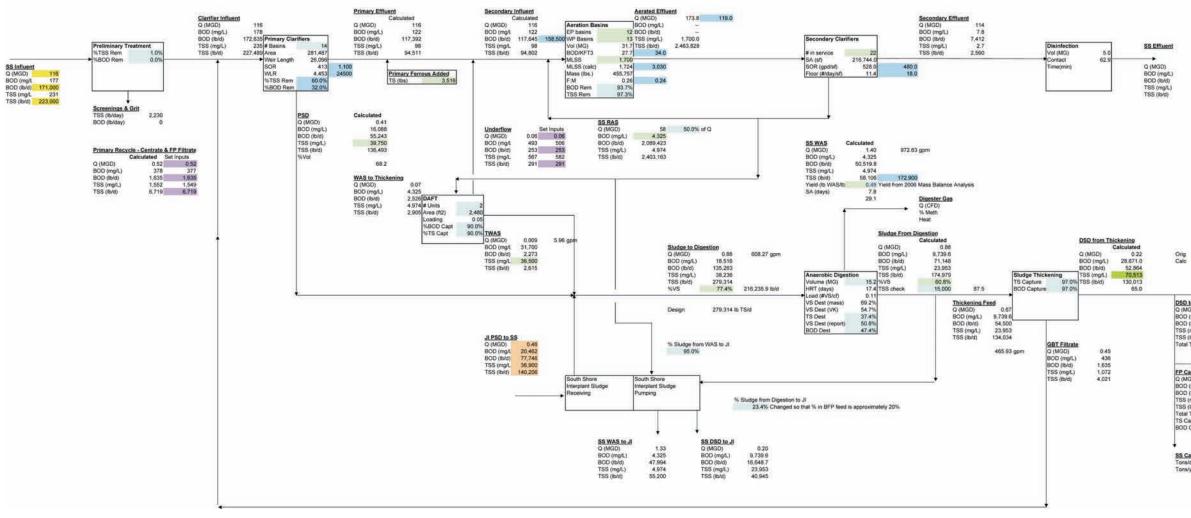




TABLE 5C-2 SHEET 1 OF 2 **REVISED 2020 BASELINE JIWWTP MASS BALANCE – AVERAGE DAY CONDITIONS** 2020 TREATMENT REPORT 5/28/07 TR_5C.T002.07.05.28.cdr

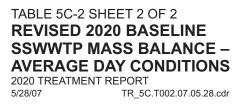
| | Given % Removals, Captures, etc. based on 2003 data | | | | | | | | | | |
|----|--|----------------------------|-----------|---------------|--------------|-------|-------|-------|-----------|----------------|-----------|
| | Given design parameters | | Primary (| Clarification | Activated Tr | eat | 1 | RAS | Secondary | Clarificatio D | isinfecti |
| | Assumed concentrations, # basins, etc from 2003 Mass Balance | | SOR | WLR | BOD Load | MLSS | | | SOR | SLR (Floor H | RT (mi |
| | Assumed concentrations from ave of 1999-2003 data | NR 110 Requirements Ave | 1,000 | 15.000 | 4 | 0 | 1,000 | 17.0 | | 34 | |
| | Assumed GBT thickened sludge concentration from 2005 data | Violation in RED Max Hour | 1,500 |) | | | 3,000 | 84.8 | 1.200 | 48 | |
| | Information from JIWWTP Mass Balance | | | | | range | 1 | epner | | | |
| | Set inputs based on calculated data | 10 St Stds Ave | 1,000 |) | 4 | 0 | 1,000 | 17.0 | | | |
| 68 | Assumed value based on value calculated in 2006 Mass Batance | Violation in BOLD Max Hour | 2.000 | 30.000 | | | 3.000 | 113 | 900 | 50 | |





| Calculater Ave | of 1999-2003 Recorded Data |
|----------------|----------------------------|
| 114.5 | |
| 7.8 | 8.6 |
| 7,412 | |
| 2.7 | 5.5 |
| 2.560 | |

| | ckening Calculated 0.22 28.671.0 52.864 70,513 130,013 65.0 | Orig Calo | % split to Agri-Life 64.6% 64.6% | Agri-Life Q (MGD) BOD (mg/I BOD (Ib/d) TSS (mg/L TSS (Ib/d) Tons Total/yr | 34,149 | | Land App Per day 0.042 Total Agri- 31,159 15.6 | Per Year 15.3 Life Per Ye | 33.3 52,826 | Lange Contraction |
|--------------------------|--|---|---|--|--|--|---|---------------------------------|----------------|-------------------|
| 45 | | DSD to Plate Q (MGD) BOD (mg/L) BOD (lb/d) TSS (mg/L) TSS (lb/d) Total Tons | 8 Frame Press 0.08 18,715.2 70.513 46,028 23 | | Filtrate Flow | % of Feed | 1 88.4% | ŝ | | |
| 436 535 072 021 | | FP Cake Q (MGD) BOD (mg/L) BOD (bld) TSS (mg/L) TSS (bld) Total Tons TS Capture BOD Capture | 0.0091 17,246 573,545 43,329 22 94,1% 92,2% | | Elitrate Q (MGD) BOD (mg/L BOD (ibid) TSS (mg/L) TSS (ibid) | 0.07 2,545.0 1,469.0 4,675.1 2,698 | | | | |
| | | SS Cake to L Tons/day Tons/yr | andfill or Land Appli 21.7 7,907.6 | cation - based | on storage | and land | ap needs | | | |



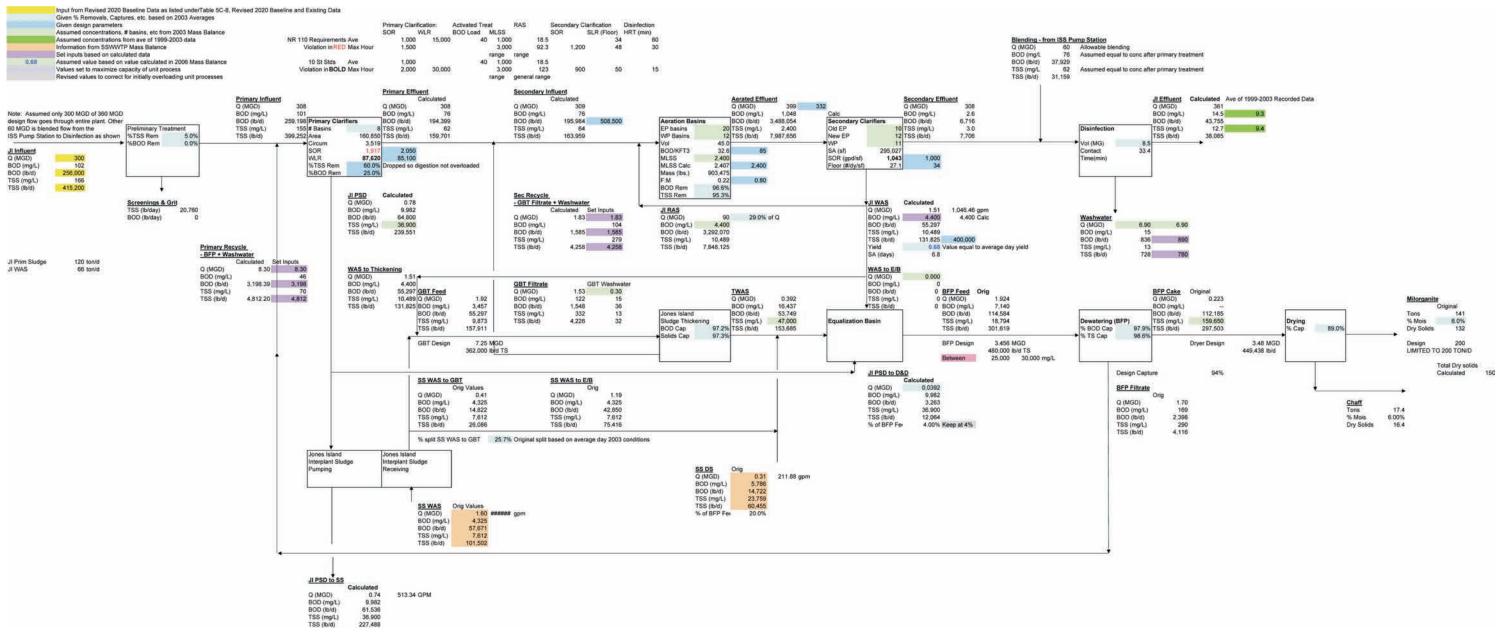
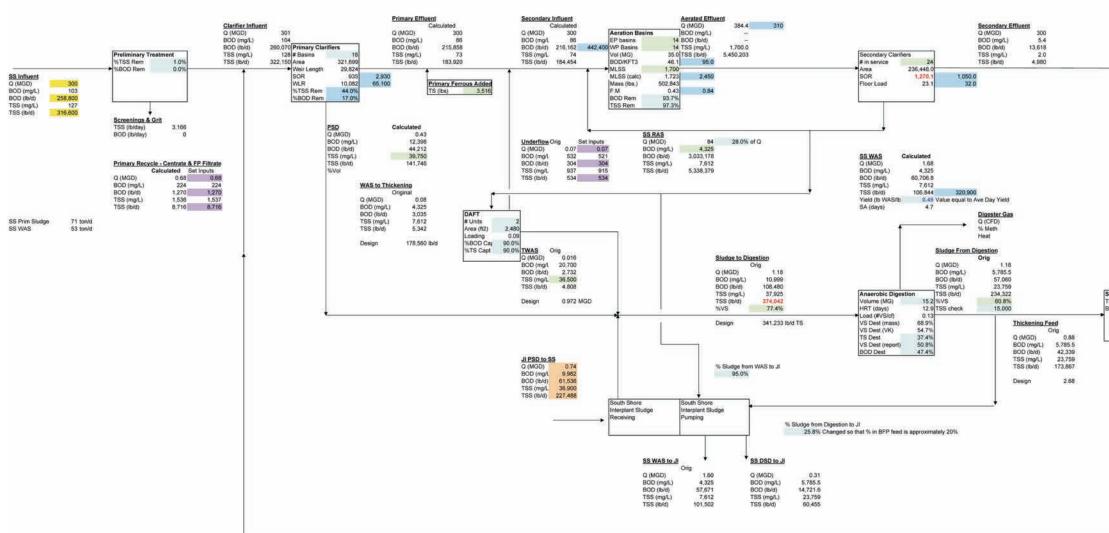




TABLE 5C-3 SHEET 1 OF 2 **REVISED 2020 BASELINE** JIWWTP MASS BALANCE -MAXIMUM DAY FLOW CONDITIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T003.07.05.28.cdr











| Sludge Thickening TS Capture 97.01 BOD Capture 97.01 | DSD from Thickening Orig Q (MGD) 0.29 BOD (mg/L) 17,170.7 BOD (bld) 41,068 TSS (mg/L) 70,513 GTSS (lbd) 168,651 | % split to Agri-Life Orig Orig 64.6% Calc | Aart-Life Orig Q (MGD) 0.185 BOD (mgL) 17,170,7 BOD (lbid) 28,529 TSS (mg/L) 70,513 TSS (mg/L) 108,945 |
|---|---|--|--|
| GBT Filtrat Q (MGD) BOD (mbd) TSS (mpL TSS (lb/d) | Orig 0.59) 258 1.270 | DSD to Plate & Frame Press Orig Orig 0.10 BOD (mg/L) 14.539.2 TSS (mg/L) 155.707 TSS (told) 59.707 Total Tons 30 EP Cake Orig Q (MGD) 0.018 BDD (mg/L) BOD (mg/L) BOD (told) 13.398 TSS (mg/L) 573.545 TSS (mg/L) 52.00 Total Tons 28 TSS Cake to Landfill or Land Applica Tons 28.1 | Design 4.6 MGD Filtrate Flow % of Feed 88.4% Filtrate Flow % of Feed 88.4% (MGD) 0.09 BOD (mgL 1.524 BOD (lbkd) 1.1412 TSS (mgL 4.767.1 TSS (lbkd) 3.500 132,600 0 lbkd TS |

TABLE 5C-3 SHEET 2 OF 2 **REVISED 2020 BASELINE** SSWWTP MASS BALANCE -MAXIMUM DAY FLOW CONDITIONS 2020 TREATMENT REPORT 5/28/07

TR_5C.T003.07.05.28.cdr

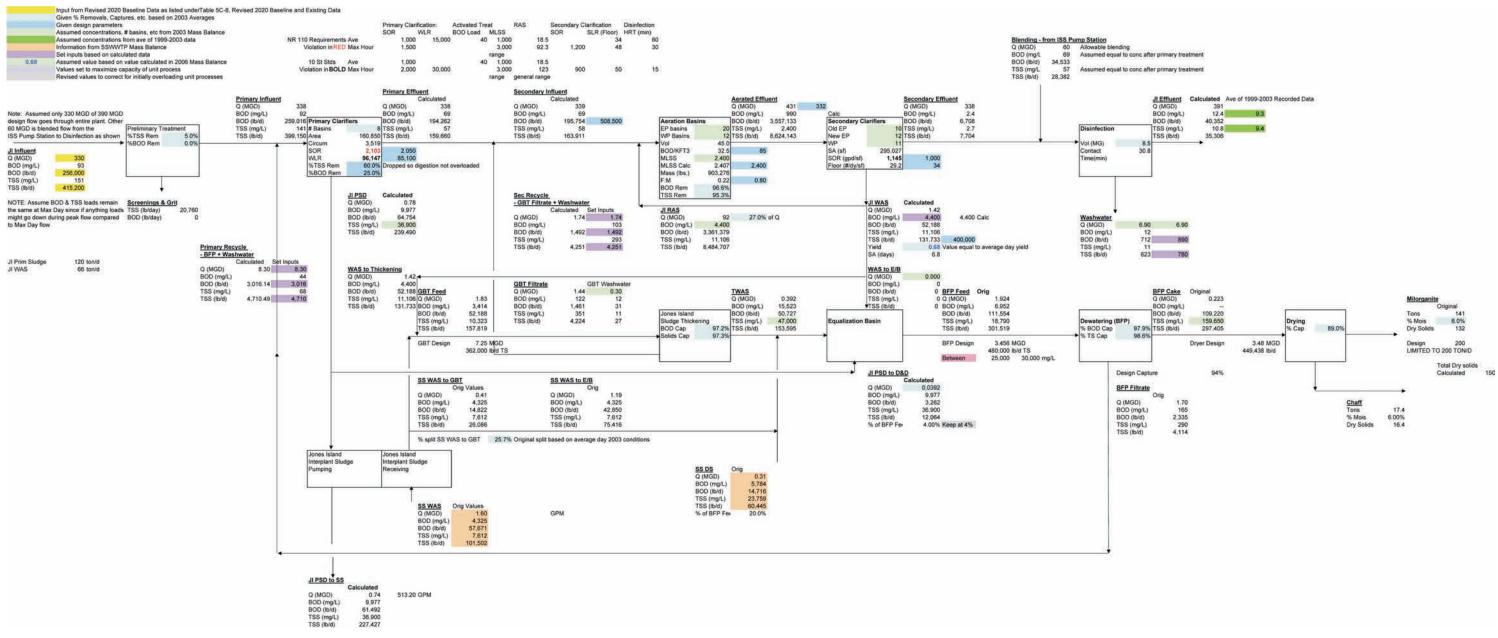




TABLE 5C-4 SHEET 1 OF 2 **REVISED 2020 BASELINE** JIWWTP MASS BALANCE -PEAK HOUR FLOW CONDITIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T004.07.05.28.cdr

| | Given % Removals, Captures, etc. based on 2003 data | | | | | | | | | |
|------|--|----------------------------|--------------|------------|---------------|-------|-------|-----------|------------------|-----------|
| | Given design parameters | | Primary Clar | ification: | Activated Tre | eat | RAS | Secondary | Clarificatio Dis | infection |
| | Assumed concentrations, # basins, etc from 2003 Mass Balance | | SOR | WLR | BOD Load | MLSS | | SOR | SLR (Floor HF | T (min) |
| | Assumed concentrations from ave of 1999-2003 data | NR 110 Requirements Ave | 1.000 | 15,000 |) 40 | 1,000 | 17.0 | 0 | 34 | 60 |
| | Assumed GBT thickened sludge concentration from 2005 data | Violation in RED Max Hour | 1,500 | | | 3,000 | 84. | 8 1,200 | 48 | 30 |
| | Information from JIWWTP Mass Balance | | | | | range | range | | | |
| | Set inputs based on calculated data | 10 St Stds Ave | 1,000 | | 40 | 1,000 | 17. | 3 | | |
| 0.68 | Assumed value based on value calculated in 2006 Mass Balance | Violation in BOLD Max Hour | 2 000 | 30,000 | | 3.000 | 11: | 3 900 | 50 | 11 |

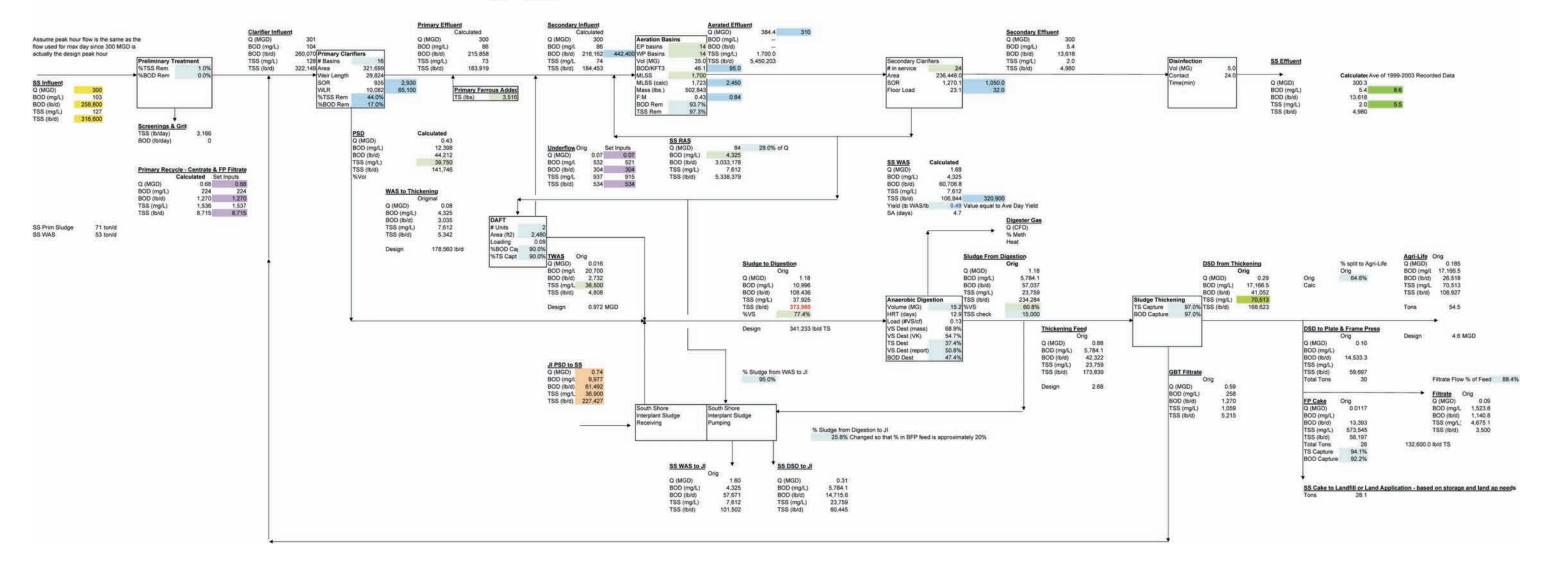




TABLE 5C-4 SHEET 2 OF 2 **REVISED 2020 BASELINE** SSWWTP MASS BALANCE -PEAK HOUR FLOW CONDITIONS 2020 TREATMENT REPORT 5/28/07

TR_5C.T004.07.05.28.cdr

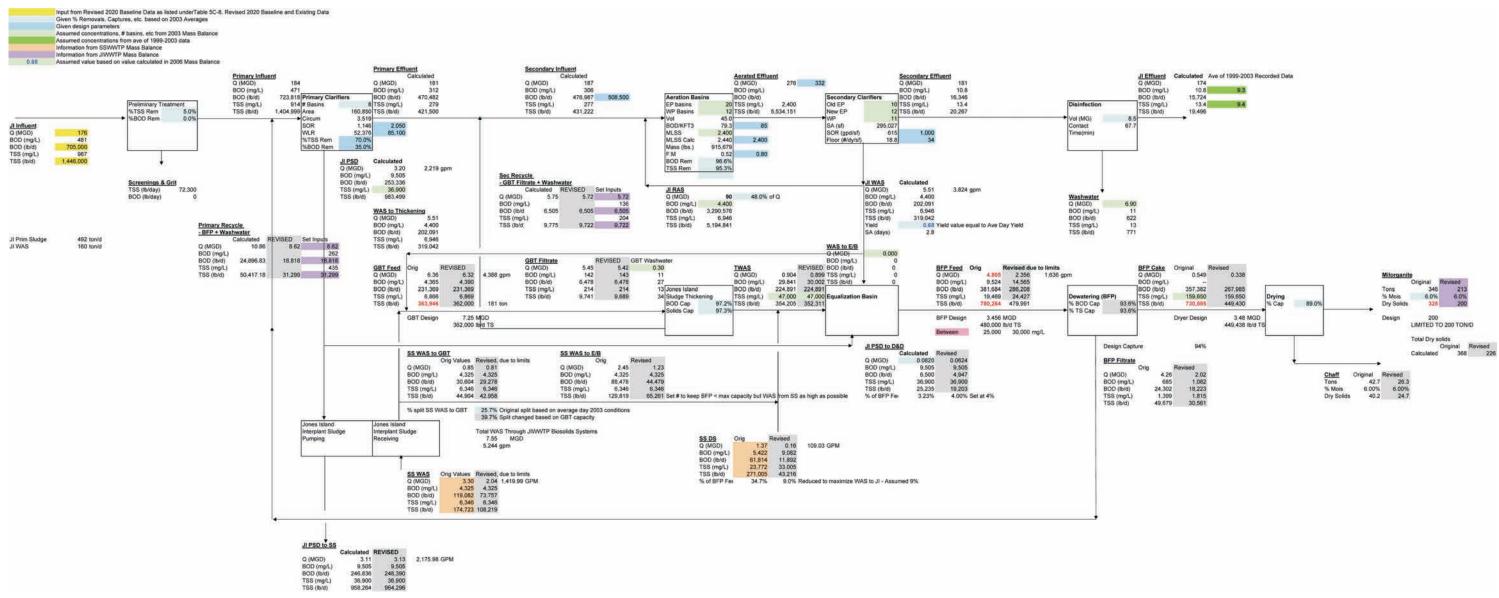




TABLE 5C-5 SHEET 1 OF 2 **REVISED 2020 BASELINE JIWWTP MASS BALANCE –** MAXIMUM DAY WASTELOAD CONDITIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T005.07.05.28.cdr

Input from Revised 2020 Baseline Data as listed und Table SC-8, Revised 2020 Baseline and Existing Dat Given % Removals, Captures, etc. based on 2003 data Given % Removals, Captures, etc. hom 2003 Mass Balance Assumed concentrations, Brom ave of 1999-2003 data Assumed Concentrations from ave of 1999-2003 data Assumed Carl Thickend situge concentration from 2005 data Information from JWWTP Mass Balance Set input Based on calculated data Assumed value based on value calculated in 2006 Mass Balance

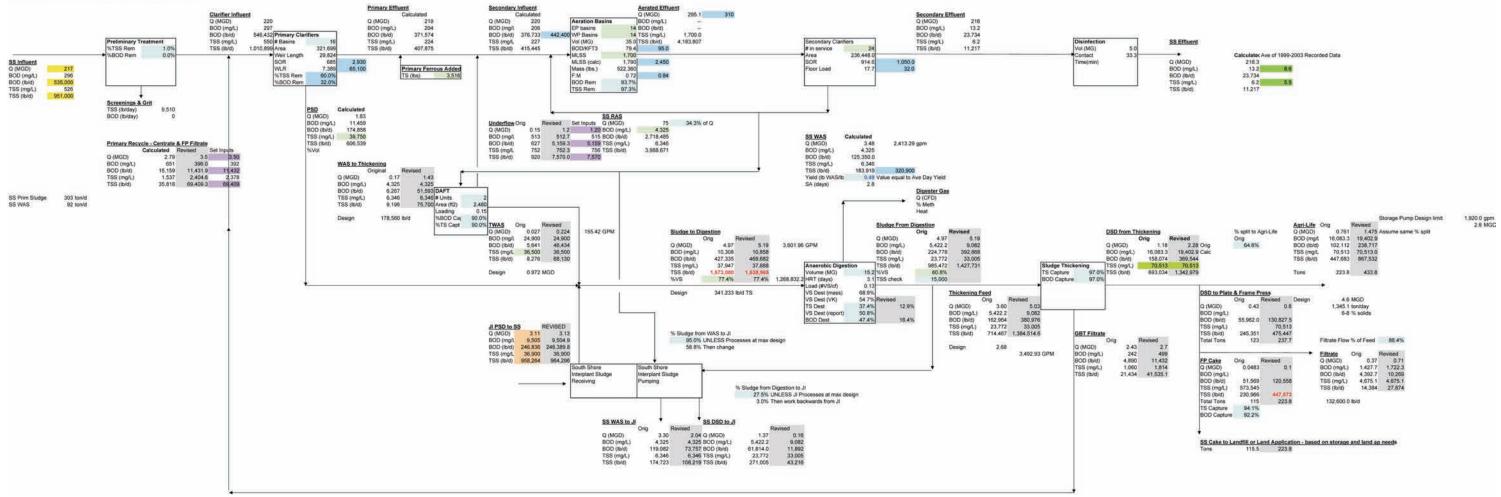




TABLE 5C-5 SHEET 2 OF 2 **REVISED 2020 BASELINE** SSWWTP MASS BALANCE -MAXIMUM DAY WASTELOAD CONDITIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T005.07.05.28.cdr

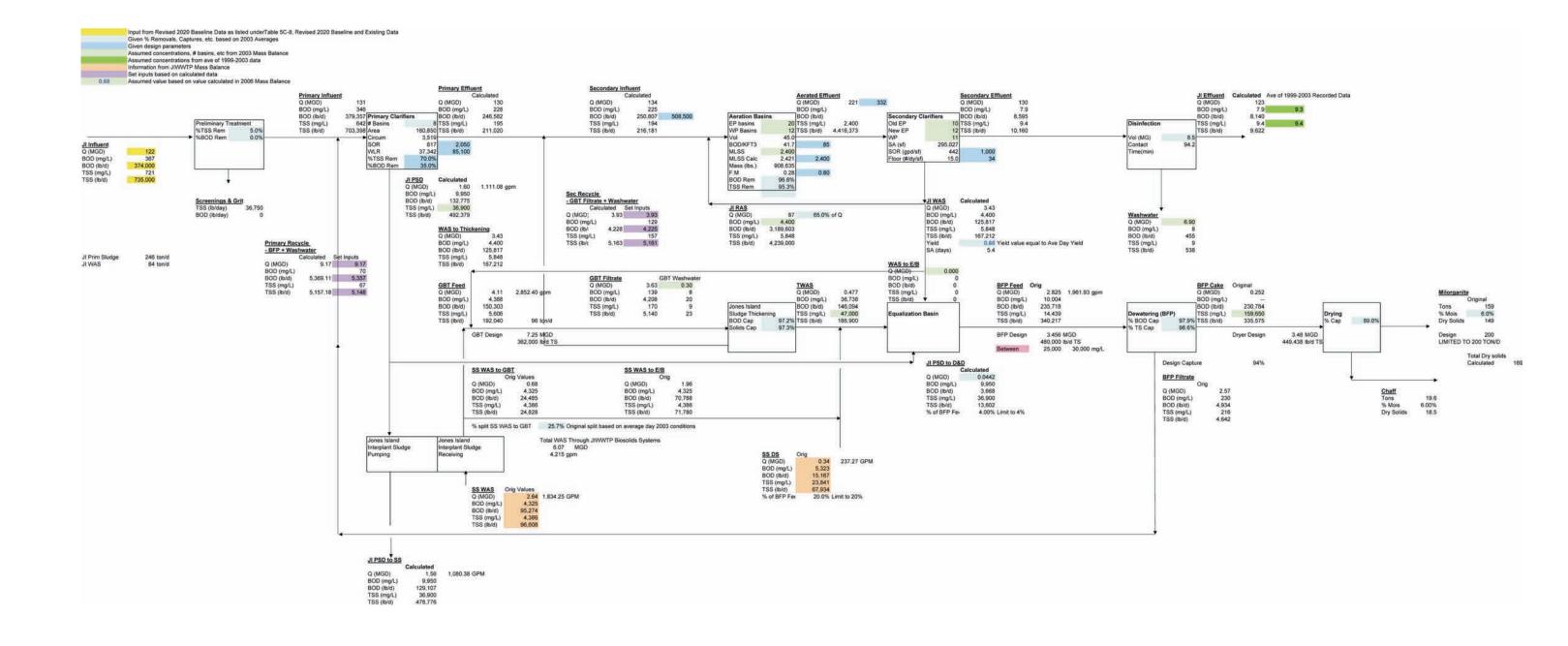




TABLE 5C-6 SHEET 1 OF 2 **REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM WEEK WASTELOAD CONDITIONS** 2020 TREATMENT REPORT 5/28/07 TR_5C.T006.07.05.28.cdr



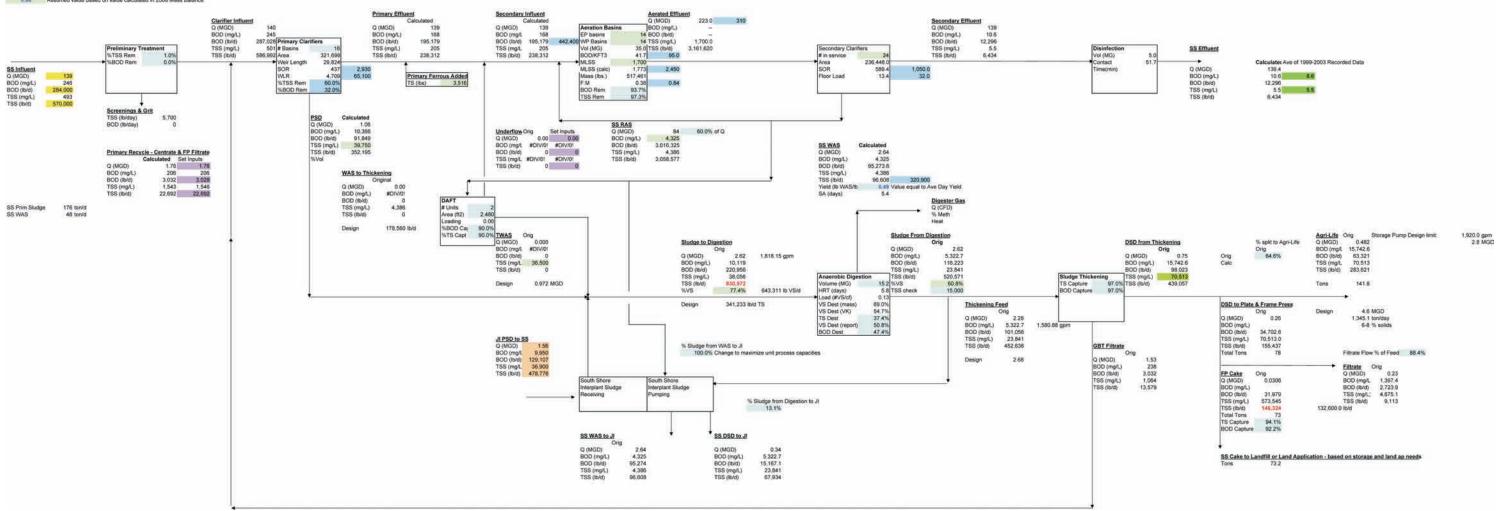




TABLE 5C-6 SHEET 2 OF 2 **REVISED 2020 BASELINE** SSWWTP MASS BALANCE -MAXIMUM WEEK WASTELOAD CONDITIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T006.07.05.28.cdr

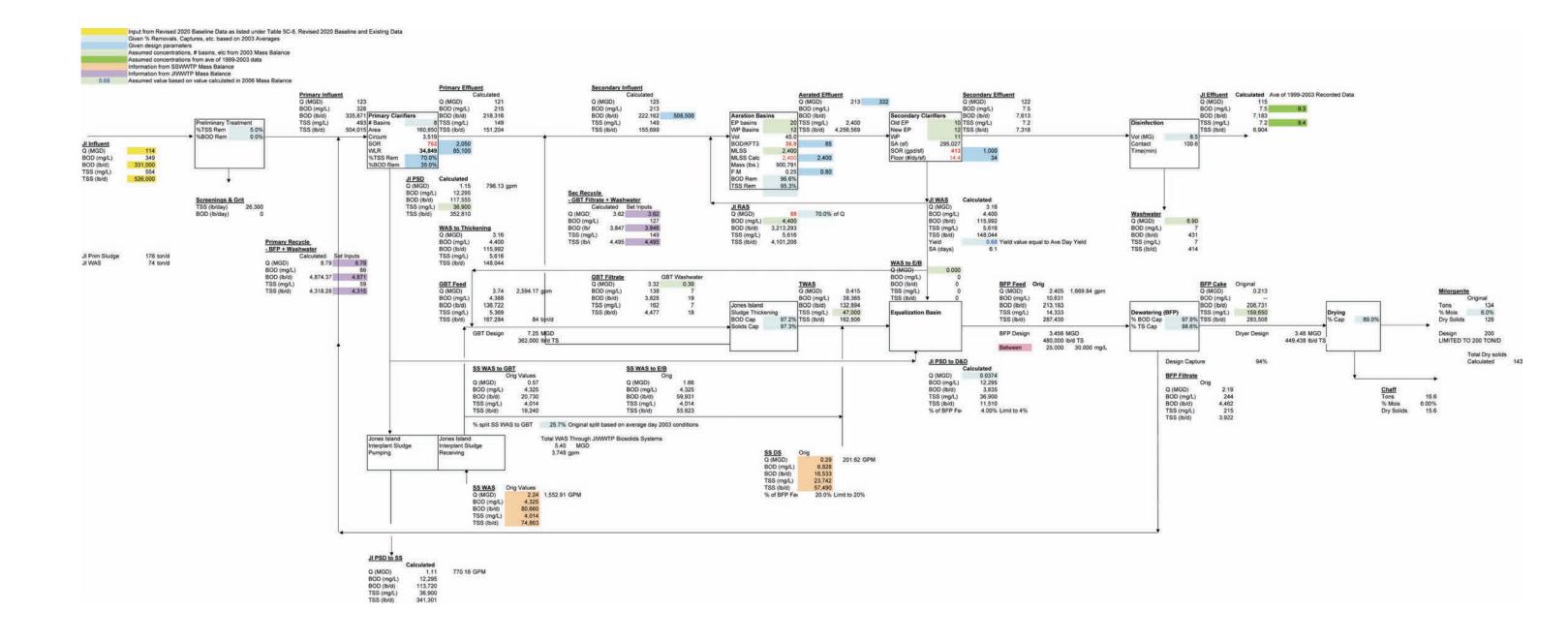




TABLE 5C-7 SHEET 1 OF 2 **REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM MONTH WASTELOAD CONDITIONS** 2020 TREATMENT REPORT 5/28/07 TR_5C.T007.07.05.28.cdr



Set inputs based on calculated data 0.68 Assumed value based on value calculated in 2005 Mass Balance

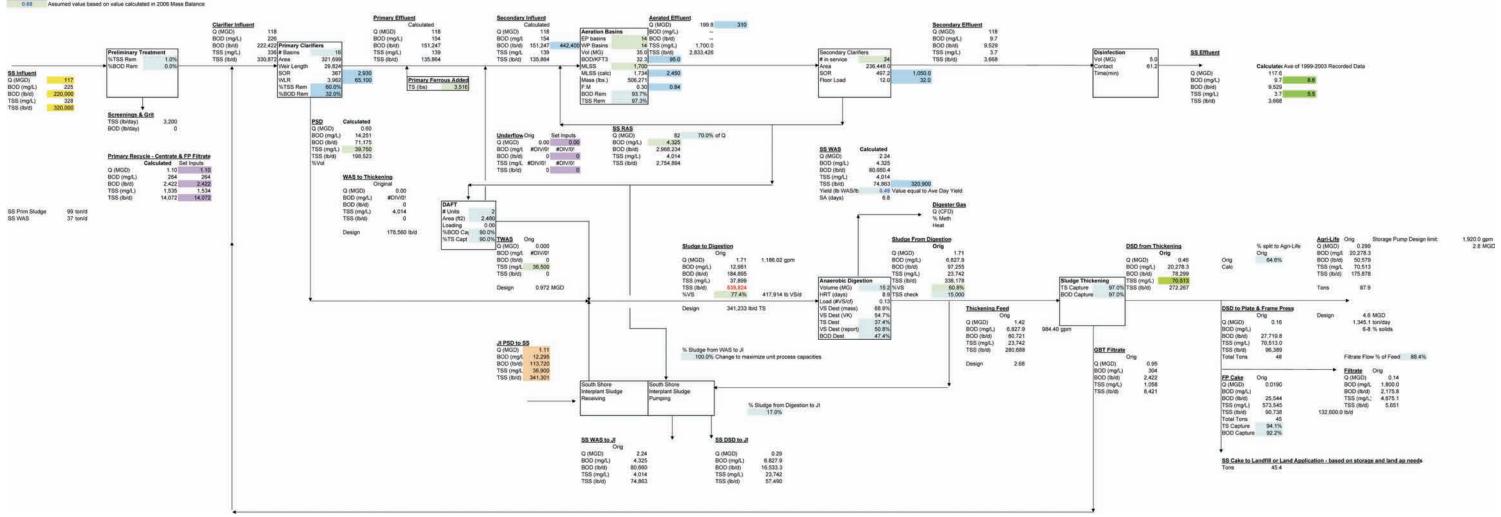




TABLE 5C-7 SHEET 2 OF 2 **REVISED 2020 BASELINE** JIWWTP MASS BALANCE -MAXIMUM MONTH WASTELOAD CONDITIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T007.07.05.28.cdr

Revised 2020 Baseline Flows & Loads

| 5 | | JIW | WTP | | SSWWTP | | | | |
|------------|-------------|-------------|--------------|---------------|-------------|-------------|--------------|---------------|--|
| | Average Day | Maximum Day | Maximum Week | Maximum Month | Average Day | Maximum Day | Maximum Week | Maximum Month | |
| Flow (MGD) | 98.8 | 360 | NA | NA | 115.7 | 300 | NA | NA | |
| BOD (lb/d) | 232,000 | 705,000 | 374,000 | 331,000 | 171,000 | 535,000 | 284,000 | 220,000 | |
| TSS (lb/d) | 220,000 | 1,446,000 | 735,000 | 526,000 | 223,000 | 951,000 | 570,000 | 320,000 | |

NA -- Not applicable

Source: Data from Appendix 5A, Future Condition Flow and Wasteload Analysis

Maximum Flows, Maximum Wasteloads

ISSUE: When WWTPs are at maximum flows, loads are less than maximum wasteloads. Conversely, when WWTPs are at maximum loads, flows are less than maximum flows.

Mass Flow/Load Determination - Revised 2020 Baseline Conditions

| | | JIWWTP | | | SSWWTP | | | |
|------------------|-------------|--|----------------|--|-------------|----------------|--|--|
| | | Total %, Maximum Values compared to | | Total %, Maximum Values compared to | | | | |
| | Average Day | Average Day | Maximum Values | Average Day | Average Day | Maximum Values | | |
| Maximum Day Flow | Ŭ _ | | | | | | | |
| Flow (MGD) | NA | NA | 360 | NA | NA | 300 | | |
| BOD (lb/d) | 232,000 | 110.3% | 256,000 | 171,000 | 151.3% | 258,800 | | |
| TSS (lb/d) | 220,000 | 188.7% | 415,200 | 223,000 | 142.0% | 316,600 | | |
| Maximum Day Wast | teloads | | | | | | | |
| Flow (MGD) | 99 | 177.8% | 176 | 116 | 187.5% | 217 | | |
| BOD (lb/d) | NA | NA | 705,000 | NA | NA | 535,000 | | |
| TSS (lb/d) | NA | NA | 1,446,000 | NA | NA | 951,000 | | |
| Maximum Week Wa | steloads | | 1. E- | | | | | |
| Flow (MGD) | 99 | 123.7% | 122 | 116 | 119.9% | 139 | | |
| BOD (lb/d) | NA | NA | 374,000 | NA | NA | 284,000 | | |
| TSS (lb/d) | NA | NA | 735,000 | NA | NA | 570,000 | | |
| Maximum Month Wa | asteloads | | | | | | | |
| Flow (MGD) | 99 | 115.2% | 114 | 116 | 101.2% | 117 | | |
| BOD (lb/d) | NA | NA | 331,000 | NA | NA | 220,000 | | |
| TSS (lb/d) | NA | NA | 526,000 | NA | NA | 320,000 | | |

Source: Analysis found in Table 5A-7, Existing Condition Maximum Flow and Load Analysis under Appendix 5A, Future Condition Flow and Wasteload Analysis



Effluent Parameter Data

| | | JIWW | TP | | SSWWTP | | | | | |
|----------|-------------|-------------|------------|----------------|-------------|-------------|------------|----------------|--|--|
| Ĩ | Monthly BOD | Monthly TSS | Monthly TP | Fecal Coliform | Monthly BOD | Monthly TSS | Monthly TP | Fecal Coliform | | |
| Year | mg/L | mg/L | mg/L | No./100 mL | mg/L | mg/L | mg/L | No./100 mL | | |
| Contract | 15 | 15 | 0.5 | 100 | 15 | 15 | 0.5 | 100 | | |
| Permit | 30 | 30 | 1 | 400 | 30 | 30 | 1 | 400 | | |
| 1999 | 9 | 11 | 0.31 | 18 | 6 | 7 | 0.64 | 19 | | |
| 2000 | 9 | 11 | 0.37 | 45 | 8 | 8 | 0.72 | 31 | | |
| 2001 | 9.3 | 9.1 | 0.4 | 37 | 8 | 9 | 0.67 | 31 | | |
| 2002 | 9.9 | 9 | 0.42 | 39 | 11 | 8 | 0.76 | 42 | | |
| 2003 | 9.4 | 6.8 | 0.36 | 44 | 8.6 | 5.5 | 0.63 | 32 | | |
| Average | 9.32 | 9.38 | 0.372 | 36.6 | 8.32 | 7.5 | 0.684 | 31 | | |

Measured effluent parameter data was used to compare projected effluent concentrations in each of the mass balances presented in this appendix.

Source: MMSD, Contract Compliance Office Annual Summary (1999-2003)

Gravity Belt Thickener (GBT) Analysis

| | | GBT Feed | | Thic | kened Digested S | ludge | | GBT Filtrate | |
|--------------------|-------------|-----------|-------------|-------------------|------------------|----------------|------|--------------|-------|
| | Q | TSS | BOD | Q | TSS | BOD | Q | TSS | BOD |
| | MGD | lb | lb | MGD | lb | lb | MGD | lb | lb |
| June | 0.18 | 36040 | 19509 | 0.05 | 34958 | 18924 | 0.13 | 1081 | 585 |
| July | 0.23 | 48160 | 31047 | 0.07 | 46715 | 30115 | 0.16 | 1445 | 931 |
| August | 0.52 | 107949 | 73547 | 0.17 | 104711 | 71341 | 0.35 | 3238 | 2206 |
| September | 0.4 | 79358 | 26944 | 0.12 | 76978 | 26135 | 0.29 | 2381 | 808 |
| October | 0.4 | 79358 | 26944 | 0.12 | 76978 | 26135 | 0.29 | 2381 | 808 |
| November | 0.46 | 94589 | 51778 | 0.15 | 91751 | 50224 | 0.31 | 2838 | 1553 |
| December | 0.4 | 82541 | 44518 | 0.18 | 80065 | 43182 | 0.22 | 2476 | 1336 |
| Average (not Oct.) | 0.37 | 74,773 | 41,224 | 0.12 | 72,530 | 39,987 | 0.24 | 2,243 | 1,237 |
| GBT Capacity: | 230 0.33 | to MGD | 250 0.36 | gpm range, MGD | 300 0.43 | gpm max MGD | | | |

NOTES:

1) Made the assumption that all sludge to be thickened sent to GBT, though centrifuges still available, since average < max capacity 2) Oct appears wrong - same as Sept, though primary sludge dry (PSD) values in 2005 UWS Monthly Report Mass Balance from JIWWTP were different - so excluded data

Source: 2005 UWS Monthly Reports Mass Balances, GBT installed May 2005 so only used last six months of data for 2005



TABLE 5C-8 SHEET 2 OF 3 **REVISED 2020 BASELINE** AND EXISTING DATA 2020 TREATMENT REPORT 5/28/07 TR 5C.T008.07.05.28.cdr

GBT Analysis (continued)

| Based on this data, | |
|--|--------|
| TSS Capture %: | 97.0% |
| BOD Capture %: | 97.0% |
| Thickened Solids Concentration (mg/L): | 70,513 |

Agri-Life® Application

| | | Agri-Life® | | | Filter Cake | | |
|----------|-------------------|------------|------------------|---------------------|-------------|---------------------|--|
| 1 | Land Applied (Dry | | | Land Applied (Dry | | | |
| | Land Applied (MG) | Tons) | Acreage Utilized | Minergy1 (Dry Tons) | Tons) | Landfill (Dry Tons) | |
| 1999 | 20.1 | 8,186 | 2,255 | 2,797 | 0 | 0 | |
| 2000 | 16.7 | 5,774 | 1,64 | 1,713 | 0 | 0 | |
| 2001 | 12.2 | 4,241 | 1,134 | 0 | 1,540 | 0 | |
| 2002 | 16.6 | 5,729 | 1,670 | 0 | 455 | 0 | |
| 2003 | 11.1 | 4,503 | 1,476 | 0 | 1,563 | 0 | |
| Avg. | 15.3 | 5,687 | 1,634 | 902 | 712 | 0 | |
| Avg. Day | 0.04 | 15.6 | 4.5 | 2.5 | 1.9 | 0.0 | |

NOTE:

1) WE Energies' Lightweight Aggregate Program

Source: Data from MMSD, Contract Compliance Office Annual Report (1999-2003) and input from MMSD personnel.



| | 2006 Pre | diction | | | | Revise | ed 2020 Bas | eline Projec | ctions | | | |
|------------------------------|----------|---------|---------|---------|---------|----------|-------------|--------------|---------|---------|---------|---------|
| | Compa | rison | | | | | Maximu | Im Day | Maximu | m Week | Maximun | n Month |
| | (Averag | e Day) | Averag | e Day | Maximum | Day Flow | Waste | loads | Waste | loads | Waste | loads |
| Treatment Plant Influent | | SSWWTP | JIWWTP | SSWWTP | JIWWTP | SSWWTP | JIWWTP | SSWWTP | JIWWTP | SSWWTP | JIWWTP | SSWWTF |
| Flow (MGD) | 82 | 89 | 99 | 116 | 360 | 300 | 176 | 217 | 122 | 139 | 114 | 117 |
| BOD (lb/day) | 193,000 | 163,000 | 232,000 | 171,000 | 256,000 | 258,800 | 705,000 | 535,000 | 374,000 | 284,000 | 331,000 | 220,000 |
| TSS (lb/day) | 186,000 | 179,000 | 220,000 | 223,000 | 415,200 | 316,600 | 1,446,000 | 951,000 | 735,000 | 570,000 | 526,000 | 320,000 |
| From Liquid Treatment | | | | | | | | _ | | | | |
| Primary Sludge (Ib TSS/day) | 72,002 | 64,825 | 148,392 | 136,493 | 239,551 | 141,746 | 983,499 | 606,539 | 492,379 | 352,195 | 352,810 | 198,523 |
| WAS (Ib TSS/day) | 106,546 | 65,049 | 103,627 | 58,106 | 131,825 | 106,844 | 319,042 | 183,919 | 167,212 | 96,608 | 148,044 | 74,863 |
| Biosolids Program Influent | | | | | | | | | | | | |
| Raw Primary (Ib TSS/day) | 8,917 | 0 | 8,186 | 0 | 12,064 | 0 | 19,203 | 0 | 13,602 | 0 | 11,510 | 0 |
| Digested Sludge (Ib TSS/day) | | 74,952 | NA | 174,979 | NA | 234,322 | NA | 1,427,731 | NA | 520,571 | NA | 338,178 |
| Raw WAS (Ib TSS/day) | 106,546 | 61,797 | 103,627 | 55,200 | 131,825 | 101,502 | 319,042 | 108,219 | 167,212 | 96,608 | 148,044 | 74,863 |
| Total | 12 | 6 | 17 | '1 | 24 | 10 | 93 | 37 | 39 | 99 | 28 | 6 |
| 2 | /→ 46,0 | 29 | 62,4 | 414 | 87, | 548 | 342, | 041 | 145, | 634 | 104,4 | 499 |
| Biosolids Product (ton/yr) | / | | | | | | | | | | | |
| Agrilife Liquid | 4,611 | | 15,327 | | NA | | NA | | NA | | NA | |
| Agrilife Cake / | 2,379 | | 7,908 | | NA | | NA | | NA | | NA | |
| Total Agrilife Products | 6,990 | | 23,235 | | NA | | NA | | NA | | NA | |
| Milorganite / | 34,923 | | 32,812 | | NA | | NA | | NA | | NA | |
| Off-Spec Product / | 0 | | 0 | | NA | | NA | | NA | | NA | |
| Chaff / | 2,629 | | 4,055 | | NA | | NA | | NA | | NA | |
| Total Dried Product | 37,552 | | 36,867 | | NA | | NA | | NA | | NA | |
| Total Biosolids | ▶ 44,542 | | 60,102 | | | | | | | | | |

The difference between the Biosolids Program Influent and the total biosolids is a result of recycle flows back to treatment plant (thickening and dewatering)

Preserving The Environment • Improving Water Quality NOTE: 2006 condition comparison developed in 2006 Mass Balance, provided in 2020 Facilites Plan project files.

> TABLE 5C-9 SUMMATION OF TOTAL BIOSOLIDS PROJECTIONS 2020 TREATMENT REPORT 5/28/07 TR_5C.T009.07.05.28.cdr

APPENDIX 5D

REVISED 2020 BASELINE CONDITION UNIT PROCESS CALCULATIONS



| | JIWWTP | | |
|------------------|--------------------------------------|-----------------------|-----------------------|
| | Secondary Plant Capacity (w/Storage) | No. of Times Capacity | No. of Times Capacity |
| DATE | MGD | < 300 MGD | < 330 MGD |
| 1-Jan | | | |
| 2-Jan | 005 | | |
| 3-Jan 4-Jan | <u>665</u> 630 | | |
| 5-Jan | 812 | | |
| 6-Jan | 591 | | |
| 7-Jan | 622 | | |
| 8-Jan | 647 | | |
| 9-Jan 10-Jan | 511 494 | | |
| 11-Jan | 523 | | |
| 12-Jan | 808 | | |
| 13-Jan | 924 | | |
| 14-Jan | 459 | | |
| 15-Jan | 437 | | |
| 16-Jan 17-Jan | 505 472 | | |
| 18-Jan | 472 | | |
| 19-Jan | 373 | | |
| 20-Jan | 338 | | |
| 21-Jan | 486 | | |
| 22-Jan | 512 | | |
| 23-Jan 24-Jan | 495 707 | | |
| 25-Jan | 712 | | |
| 26-Jan | 577 | | |
| 27-Jan | 437 | | |
| 28-Jan | 461 | | |
| 29-Jan | 473 | | |
| 30-Jan | 473 487 | | |
| 31-Jan 1-Feb | 487 476 | | |
| 2-Feb | 402 | | |
| 3-Feb | 434 | | |
| 4-Feb | 386 | | |
| 5-Feb | 346 | | |
| 6-Feb | 398 | | |
| 7-Feb 8-Feb | 401 324 | | 1 |
| 9-Feb | 307 | | 1 |
| 10-Feb | 253 | 1 | * |
| 11-Feb | 262 | 1 | |
| 12-Feb | 234 | 1 | |
| 13-Feb | 335 | | |
| 14-Feb 15-Feb | 460 373 | | |
| 16-Feb | 349 | | |
| 17-Feb | 287 | 1 | |
| 18-Feb | 234 | 1 | |
| 19-Feb | 208 | 1 | |
| 20-Feb 21-Feb | 289 359 | 1 | |
| 21-Feb | 396 | | |
| 23-Feb | 362 | | |
| 24-Feb | 360 | | |
| 25-Feb | 321 | | 1 |
| 26-Feb | 261 | 1 | |
| 27-Feb 28-Feb | <u>280</u> 417 | 1 | |
| 28-Feb 1-Mar | 417 493 | | |
| 2-Mar | 550 | | |
| 3-Mar | 590 | | |
| 4-Mar | 527 | | |
| 5-Mar | 439 | | |
| 6-Mar Z-Mar | 530 | | |
| 7-Mar 8-Mar | 541 464 | | |
| 9-Mar | 404 454 | | |
| 10-Mar | 469 | | |
| 11-Mar | 453 | | |
| 12-Mar | 423 | | |
| 13-Mar | 444 | | |
| 14-Mar 15-Mar | <u>383</u> 381 | | |
| 15-Mar 16-Mar | 381 388 | | |
| io-war | 500 | | |



TABLE 5D-1 SHEET 1 OF 5SECONDARY TREATMENTCAPACITY ANALYSIS2020 TREATMENT REPORT6/2/07TR_5D.T001.07.06.02.cdr

| | JIWWTP | | |
|---|--------------------------------------|-----------------------|-----------------------|
| | Secondary Plant Capacity (w/Storage) | No. of Times Capacity | No. of Times Capacity |
| DATE | MGD | < 300 MGD | < 330 MGD |
| 17-Mar | 388 | | |
| 18-Mar | 427 | | |
| 19-Mar | 416 | | |
| 20-Mar 21-Mar | 333 351 | | |
| 21-mar 22-Mar | 309 | | 1 |
| 23-Mar | 255 | 1 | 1 |
| 24-Mar | 283 | 1 | |
| 25-Mar | 242 | 1 | |
| 26-Mar | 329 | | 1 |
| 27-Mar | 324 | | 1 |
| 28-Mar | 406 | | |
| 29-Mar 30-Mar | 427 512 | | |
| 31-Mar | 454 | | |
| 1-Apr | 608 | | |
| 2-Apr | 335 | | |
| 3-Apr | 478 | | |
| 4-Apr | 589 | | |
| 5-Apr | 687 | | |
| 6-Apr | 630 | | |
| 7-Apr 8-Apr | 463 486 | | |
| 9-Apr | 529 | | |
| 10-Apr | 459 | | |
| 11-Apr | 470 | | |
| 12-Apr | 460 | | |
| 13-Apr | 507 | | |
| 14-Apr | 545 | | |
| 15-Apr | 322 | | 1 |
| 16-Apr | 272 | 1 | |
| 17-Apr 18-Apr | 143 145 | 1 | |
| 19-Apr | 145 | 1 | |
| 20-Apr | 306 | | 1 |
| 21-Apr | 198 | 1 | |
| 22-Apr | 275 | 1 | |
| 23-Apr | 286 | 1 | |
| 24-Apr | 522 | | |
| 25-Apr | 739 | | |
| 26-Apr | 916 1109 | | |
| 27-Apr 28-Apr | 1171 | | |
| 29-Apr | 992 | | |
| 30-Apr | 969 | | |
| 1-May | 831 | | |
| 2-May | 822 | | |
| 3-May | 703 | | |
| 4-May | 700 | | |
| 5-May | 800 | | |
| 6-May 7-May | 360 | | |
| 8-May | | | |
| 9-May | 435 | | |
| 10-May | 423 | | |
| 11-May | 527 | | |
| 12-May | 529 | | |
| 13-May | 480 | | |
| 14-May 15-May | <u>391</u> 403 | | |
| 15-мау 16-Мау | 403 | | |
| 17-May | 633 | | |
| 18-May | 619 | | |
| 19-May | 637 | | |
| 20-May | 427 | | |
| 21-May | 360 | | |
| 22-May | 383 | | |
| 23-May | 471 | | |
| 24-May 25-May | 513 | | |
| 25-May 26-May | <u>385</u> 370 | | |
| 20-may 27-May | 256 | 1 | |
| 28-May | 247 | 1 | |
| 214000000000000000000000000000000000000 | 77.624 | | |
| 29-May 30-May | 360 428 | | |



TABLE 5D-1 SHEET 2 OF 5SECONDARY TREATMENTCAPACITY ANALYSIS2020 TREATMENT REPORT6/2/07TR_5D.T001.07.06.02.cdr

| | | JIWWTP | |
|-------------------|--------------------------------------|-----------------------|-----------------------|
| | Secondary Plant Capacity (w/Storage) | No. of Times Capacity | No. of Times Capacity |
| DATE | MGD | < 300 MGD | < 330 MGD |
| 31-May | 353 | | |
| 1-Jun 2-Jun | 352 565 | | |
| | 585 | | |
| 4-Jun | 595 | | |
| 5-Jun | 372 | | |
| 6-Jun | 457 | | |
| 7-Jun 8-Jun | 452 318 | | 1 |
| 9-Jun | 318 | | 1 |
| 10-Jun | 229 | 1 | |
| 11-Jun | 248 | 1 | |
| 12-Jun | 310 | | 1 |
| 13-Jun 14-Jun | <u>520</u> 650 | | |
| 15-Jun | 752 | | |
| 16-Jun | 935 | | |
| 17-Jun | 805 | | |
| 18-Jun | 713 | | |
| 19-Jun 20-Jun | 792 911 | | |
| 20-5011 21-Jun | 1031 | | |
| 22-Jun | 957 | | |
| 23-Jun | 1059 | | |
| 24-Jun | 1115 | | |
| 25-Jun 26-Jun | <u>852</u> 815 | | |
| 27-Jun | 844 | | |
| 28-Jun | 961 | | |
| 29-Jun | 871 | | |
| 30-Jun | 684 | | |
| 1-Jul 2-Jul | 787 | | |
| | 809 | | |
| 4-Jul | 771 | | |
| 5-Jul | 747 | | |
| 6-Jul | 956 | | |
| 7-Jul 8-Jul | <u>991</u> 881 | | |
| 9-Jul | 1117 | | |
| 10-Jul | 931 | | |
| 11-Jul | 1508 | | |
| 12-Jul | 1447 | | |
| 13-Jul 14-Jul | 1226 1157 | | |
| 15-Jul | 858 | | |
| 16-Jul | 769 | | |
| 17-Jul | 700 | | |
| 18-Jul | 685 | | |
| 19-Jul 20-Jul | 668 | | |
| 20-501 21-Jul | 920 | | |
| 22-Jul | 230 | 1 | |
| 23-Jul | 270 | 1 | |
| 24-Jul | 407 | | |
| 25-Jul 26-Jul | 584 871 | | |
| 27-Jul | 955 | | |
| 28-Jul | 1294 | | |
| 29-Jul | 1256 | | |
| 30-Jul | 1133 | | |
| 31-Jul 1-Aug | 1158 | | |
| 2-Aug | 1074 | | |
| 3-Aug | 1102 | | |
| 4-Aug | 699 | | |
| 5-Aug | 638 | | |
| 6-Aug 7-Aug | 584 735 | | |
| 8-Aug | 735 | | |
| 9-Aug | 846 | | |
| 10-Aug | 846 | | |
| 11-Aug | 568 | | |
| 12-Aug | 525 | | |



TABLE 5D-1 SHEET 3 OF 5SECONDARY TREATMENTCAPACITY ANALYSIS2020 TREATMENT REPORT6/2/07TR_5D.T001.07.06.02.cdr

| Secondary Plant Capacity (wStorage) No. of Tames Capacity No. of Tames Capacity DAT 4309 MOD 4309 MOD 4309 MOD 164.00 100 4309 MOD 4309 MOD 164.00 100 4309 MOD 4309 MOD 164.00 100 100 100 164.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 100 100 174.00 100 | | JIWWTP | | |
|---|--------|--------------------------------------|-----------------------|-----------------------|
| H-Aug 93 15-Aug 100 15-Aug 100 15-Aug 90 15-Aug 91 15-Aug 91 15-Aug 91 15-Aug 91 15-Aug 91 16-Aug 92 1 1 24-Aug 93 34-Aug 93 35-Bag | | Secondary Plant Capacity (w/Storage) | No. of Times Capacity | No. of Times Capacity |
| 15-Aug 700 15-Aug 1000 15-Aug 801 15-Aug 801 15-Aug 272 1 15-Aug 272 1 15-Aug 10 1 15-Aug 10 1 15-Aug 10 1 16-Aug 10 1 17-Aug 100 1 17-Aug | DATE | MGD | < 300 MGD | < 330 MGD |
| 194.40 103 194.40 86 194.40 66 194.40 1 194.40 1 194.40 16 194.40 16 194.40 16 194.40 16 194.40 16 194.40 16 194.40 16 194.40 16 194.40 30 1 1 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 30 194.40 | 14-Aug | | | |
| 17 Aug 850 18 Aug 90 17 Aug 92 17 Aug 92 18 Aug 10 19 Aug 10 11 Aug 10 12 Aug 10 13 Aug 10 14 Aug 10 15 Aug 1 24 Aug 10 16 Aug 1 25 Aug 337 17 Aug 322 18 Aug 1 25 Aug 321 18 Aug 1 36 Aug 321 18 Aug 321 19 Aug 321 1 Aug 337 1 Aug 321 1 Aug 337 | 15-Aug | | | |
| 18 Aug 981 18 Aug 283 1 Aug 283 1 Aug 283 1 Aug 10 1 Aug 182 1 Aug 183 1 Aug 183 1 Aug 183 1 Aug 183 1 Aug 192 2 Aug 297 2 Aug 392 3 Aug 413 2 Aug 413 3 Aug 416 3 Aug 416 3 Aug 100 3 Aug 101 3 Aug< | 17-Aug | | | |
| 19 Aug 946 11 1 21 Aug 10 11 1 22 Aug 1 23 Aug 160 24 Aug 160 24 Aug 160 24 Aug 350 24 Aug 350 25 Aug 350 25 Aug 350 25 Aug 350 25 Aug 350 35 Aug 100 | 18-Aug | | | |
| 21.Aug 185 1 22.Aug 10 1 23.Aug 203 1 24.Aug 203 1 25.Aug 203 1 26.Aug 307 1 37.Aug 321 1 37.Aug 327 1 37.Aug 327 1 36.Aug 600 1 4.58p 601 1 4.58p 601 1 5.58p 1001 1 1.58p 1017 1 1.58p 1017 1 1.58p 1017 1 1.58p 1021 1 1.58p | 19-Aug | 546 | 2 | |
| 22.Aug 110 1 23.Aug 182 1 24.Aug 183 1 24.Aug 387 1 27.Aug 382 1 27.Aug 382 1 27.Aug 382 1 27.Aug 382 1 28.Aug 443 1 39.Aug 43 1 39.Aug 30 1 1 39.Aug 443 1 1 39.Aug 443 1 1 39.Aug 446 1 1 38.Aug 371 1 1 4.489 60 1 1 4.489 100 1 1 5.89 160 1 1 14.89 177 1 1 14.89 100 1 1 14.89 100 1 1 14.89 100 1 1 | | | | |
| 23.Aug 182 1 23.Aug 188 1 23.Aug 201 1 23.Aug 201 1 23.Aug 443 1 23.Aug 443 1 23.Aug 300 1 30.Aug 100 1 30.Aug 100 <th></th> <th></th> <th></th> <th></th> | | | | |
| 24.4ug 188 1 23.4ug 23 1 23.4ug 387 1 23.4ug 387 1 23.4ug 387 1 23.4ug 387 1 23.4ug 389 1 23.4ug 321 1 34.4ug 321 1 34.4ug 321 1 34.4ug 321 1 34.5ug 37 1 35.8ug 600 1 35.8ug 600 1 35.8ug 600 1 35.8ug 100 | | | | |
| 22 Aug 203 1 22 Aug 387 27 Aug 387 27 Aug 387 28 Aug 389 28 Aug 389 38 Aug 389 39 Aug 39 30 Aug 39 30 Aug 39 30 Aug 39 30 Aug 39 31 38 Aug 39 32 38 Aug | | 158 | | |
| 27-Aug 392 28-Aug 443 28-Aug 413 38-Aug 30 1 39 34-9 37 1 39 34-9 37 28-9 476 38-9 355 48-9 675 48-9 675 58-9 100 58-9 140 58-9 1474 10-39 151 11-38 153 11-38 157 11-38 157 11-38 157 11-38 157 11-38 157 11-38 158 11-38 157 11-38 157 11-38 158 11-38 158 11-38 158 11-38 158 11-38 158 12-38 159 13-38 159 13-38 1 | 25-Aug | 203 | 1 | |
| 28-Aug 443 30-Aug 399 31-Aug 399 31-Aug 31 1 1 1 1 280 56 4580 556 4580 656 5580 600 6580 600 6580 600 7580 100 7580 100 7580 100 7580 101 10580 151 11580 154 12580 1579 13580 1777 14580 1777 1589 192 19580 192 19580 1930 20580 1932 21580 1932 21580 1932 22580 977 22580 977 22580 997 22580 997 23580 997 24580 <td< th=""><th></th><th></th><th></th><th></th></td<> | | | | |
| 39-Aug 418 31-Aug 39 31-Aug 31 14-5ep 31 14-5ep 31 2-5ep 31 4-5ep 36 5-5ep 1460 7-5ep 169 6-5ep 149 7-5ep 169 6-5ep 1474 10-5ep 159 3-5ep 1474 10-5ep 159 3-5ep 159 13-5ep 159 13-5ep 159 13-5ep 159 14-5ep 177 16-5ep 1326 17-5ep 1482 18-5ep 1326 19-5ep 1327 22-5ep 132 23-5ep 1401 | | | | |
| 38-Aug 399 31-Aug 321 1 1-Sep 337 1 1-Sep 337 1 1-Sep 337 1 1-Sep 337 1 1-Sep 357 1 1-Sep 651 1 1-Sep 659 100 5-Sep 1601 1 1-Sep 1611 1 1-Sep 1541 1 1-Sep 1554 1 1-Sep 1777 1 1 1-Sep 1777 1 1 1-Sep 1757 1 1 1-Sep 1757 1 1 1-Sep 1757 1 1 1-Sep 1322 2 2 1-Sep 132 2 2 1-Sep 132 2 2 1-Sep 132 2 2 2-Sep 1990 102 | | | | |
| 31-Aug 321 1 1-Sep 337 348 2-Sep 478 359 3-Sep 351 351 4-Sep 359 351 4-Sep 359 351 5-Sep 160 559 7-Sep 169 353 3-Sep 177 359 10-Sep 1521 351 11-Sep 1541 359 15-Sep 177 359 15-Sep 1777 359 15-Sep 1326 352 16-Sep 1328 352 16-Sep 1329 352 16-Sep 1329 352 16-Sep 1329 352 16-Sep 1329 352 16-Sep 1320 353 22-Sep 1401 353 22-Sep 1401 353 22-Sep 1401 353 23-Sep 1401 353 | | | | |
| 28ep 476 348ep 555 458p 675 658p 690 658p 1480 78ep 169 858p 169 958p 167 1058p 151 1158p 1521 1158p 1534 128ep 1579 138ep 1536 1458p 1536 158ep 1536 158ep 1369 1658ep 1369 178ep 1487 1858p 1382 2258p 1369 128ep 1382 2258p 1397 2358p 1401 2458p 1401 | | | | 1 |
| 38p 535 48p 675 58p 690 68p 140 78p 169 98p 144 108p 151 118p 1541 128p 1541 138p 1541 148p 177 158p 178 158p 179 158p 177 158p 170 168p 170 178p 182 2248p 997 238p 1051 248p 901 258p 1051 248p 901 258p 90 258p 648 308p 755 20ct 182 70ct 98 | 1-Sep | | | |
| 45ep 675 55ep 690 65ep 1400 75ep 1691 85ep 1379 85ep 1414 1059 1541 113ep 1579 113ep 1579 113ep 1579 115ep 1777 115ep 1326 125ep 1392 1382 1392 1483ep 1392 151 1326 1528ep 1097 1528ep 1097 1528ep 1097 158ep 1097 158ep 1097 158ep 1097 158ep 1097 | 2-Sep | | | |
| 6-Sep 660 6-Sep 1400 7-Sep 1691 8-Sep 1379 8-Sep 1379 9-Sep 1474 10-Sep 1521 11-Sep 1579 11-Sep 1574 11-Sep 1574 11-Sep 1777 11-Sep 1326 11-Sep 1328 12-Sep 1321 12-Sep 1322 12-Sep 1321 12-Sep 1321 12-Sep 1321 12-Sep 997 12-Sep 988 13-Sep 1975 13-Sep 1975 14-Sep | | | | |
| 6.5ep 1400 7.5ep 1601 8.5ep 1379 9.5ep 1474 10.5ep 1521 11.5ep 1541 12.5ep 1641 13.5ep 1679 14.5ep 1679 15.5ep 1674 14.5ep 1677 15.5ep 1326 11.5ep 1326 11.5ep 1326 11.5ep 1322 11.5ep 1322 11.5ep 1332 22.5ep 1399 22.5ep 1392 22.5ep 1392 22.5ep 1392 22.5ep 1097 23.5ep 1005 24.5ep 1097 25.5ep 1097 25.5ep 1097 25.5ep 1097 25.5ep 1005 25.5ep 1090 25.5ep 1091 26.5e1 1002 26.5e1 | 4-5ep | | | |
| 7.8ep 1691 8.8ep 1379 9.8ep 1474 10.8ep 1521 11.8ep 1641 12.8ep 1579 13.8ep 1579 14.8ep 1777 16.8ep 1320 17.8ep 1641 18.8ep 1777 18.8ep 1787 18.8ep 1320 17.8ep 1487 18.8ep 1320 18.8ep 1322 23.9ep 1497 24.8ep 1497 25.8ep 997 25.8ep 988 25.8ep 988 25.8ep 988 26.9e 4 | 6-Sep | 1490 | | |
| 8-Sep 1379 9-Sep 1474 10-Sep 1521 11-Sep 1541 12-Sep 1579 13-Sep 1579 13-Sep 1579 13-Sep 1777 14-Sep 1777 16-Sep 1737 16-Sep 1739 17-Sep 1320 18-Sep 1739 19-Sep 1320 19-Sep 1321 22-Sep 997 23-Sep 1055 24-Sep 1401 25-Sep 997 23-Sep 997 23-Sep 648 30-Sep 997 24-Sep 881 28-Sep 888 28-Sep 648 30-Sep 795 1-Oct 1079 0-Oct 1029 0-Oct 1029 0-Oct 1029 0-Oct 1053 10-Oct | 7-Sep | 1691 | | |
| 10-Sep 1521 11-Sep 1541 12-Sep 1579 13-Sep 1584 14-Sep 1777 16-Sep 1767 16-Sep 120 17-Sep 1487 18-Sep 1392 18-Sep 1392 20-Sep 1432 21-Sep 1382 22-Sep 997 23-Sep 1055 24-Sep 888 23-Sep 648 30-Sep 796 1-Oct 973 2-Oct 890 4-Oct 891 4-Oct 893 4-Oct 893 4-Oct 193 4-Oct 193 4-Oct 193 4-Oct 192 | 8-Sep | | | |
| 11:Sep 1541 12:Sep 1579 13:Sep 1584 14:Sep 1777 15:Sep 1777 15:Sep 1787 16:Sep 1326 17:Sep 1487 19:Sep 1392 19:Sep 1392 19:Sep 1322 21:Sep 997 23:Sep 1005 24:Sep 997 23:Sep 851 24:Sep 851 25:Sep 990 27:Sep 888 29:Sep 648 30:Sep 795 10:Oct 890 4:Oct 913 5:Oct 1029 6:Oct 882 7:Oct 958 9:Oct 1142 <th>9-Sep</th> <th></th> <th></th> <th></th> | 9-Sep | | | |
| 12.5sp 1579 13.5sp 1584 14.5sp 1777 16.5sp 1757 16.5sp 1326 17.5sp 1487 18.5sp 1392 19.5sp 1392 20.5sp 1392 22.5sp 997 23.5sp 1055 24.5sp 1005 24.5sp 997 26.5sp 990 27.5sp 648 28.5sp 648 29.5sp 648 30.5dt 913 40ct 913 40ct 913 50ct 1029 60ct 1029 60ct 1029 60ct 1029 10.6ct 1166 | | | | |
| 13.5ep 1584 14.5ep 1777 15.5ep 1777 16.5ep 1326 17.5ep 1487 18.5ep 1399 19.5ep 1399 20.5ep 1322 21.5ep 1382 22.5ep 997 23.5ep 1055 24.5ep 997 23.5ep 997 23.5ep 997 23.5ep 997 23.5ep 997 23.5ep 997 23.5ep 990 27.5ep 888 29.5ep 648 30.5ep 775 10ct 973 20ct 818 30ct 890 40ct 913 50ct 1029 60ct 882 70ct 958 80ct 1142 10.0ct 1136 10.0ct 1136 10.0ct 1326 <th></th> <th>1541</th> <th></th> <th></th> | | 1541 | | |
| 14.Sep 1777 15.Sep 1757 16.Sep 1326 17.Sep 1487 18.Sep 1392 20.Sep 1392 22.Sep 1382 22.Sep 997 23.Sep 1005 24.Sep 1005 24.Sep 997 25.Sep 997 26.Sep 997 27.Sep 885 28.Sep 997 29.Sep 990 20.ct 818 30.Sep 795 1.0ct 973 2.0ct 810 3.0ct 801 3.0ct 802 7.0ct 963 3.0ct 802 7.0ct 964 10.0ct 1105 | | | | |
| 15-Sep 1757 16-Sep 1326 17-Sep 1487 18-Sep 1399 19-Sep 1399 22-Sep 1487 21-Sep 1382 22-Sep 1432 21-Sep 1382 22-Sep 1055 22-Sep 107 23-Sep 907 23-Sep 907 23-Sep 907 23-Sep 907 24-Sep 907 25-Sep 907 26-Sep 907 27-Sep 888 30-Sep 644 30-Sep 755 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 122 | | | | |
| 17.5ep 1487 18.5ep 1392 19.5ep 1399 20.5ep 1432 21.5ep 997 22.5ep 997 23.5ep 1055 24.5ep 907 25.5ep 907 26.5ep 851 26.5ep 861 26.5ep 648 30.5ep 755 1-Oct 973 2-Oct 818 3-Oct 800 4-Oct 913 5-Oct 1029 5-Oct 1029 5-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1326 12-Oct 1392 13-Oct 123 14-Oct 1326 12-Oct 1392 13-Oct 123 | 15-Sep | | | |
| 18-Sep 1392 20-Sep 1399 22-Sep 1392 22-Sep 1382 22-Sep 997 22-Sep 1055 22-Sep 997 23-Sep 1005 24-Sep 1401 25-Sep 990 27-Sep 885 28-Sep 980 27-Sep 886 28-Sep 980 29-Sep 648 30-Sep 755 1-Oct 973 2-Oct 818 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 1123 5-Oct 1029 6-Oct 988 8-Oct 1142 10-Oct 1142 10-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 14-Oct 1143 | 16-Sep | | | |
| 19-Sep 1399 20-Sep 1432 21-Sep 1382 22-Sep 997 23-Sep 1055 24-Sep 997 25-Sep 997 26-Sep 997 26-Sep 997 26-Sep 997 27-Sep 851 28-Sep 980 29-Sep 648 30-Sep 648 30-Sep 648 30-Sep 648 30-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 913 5-Oct 822 7-Oct 988 8-Oct 1053 9-Oct 1142 10-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1322 13-Oct 1223 14-Oct 1143 16-Oct 1821 | 17-Sep | | | |
| 20-Sep 1432 21-Sep 1382 22-Sep 907 23-Sep 1005 24-Sep 1401 25-Sep 990 26-Sep 990 27-Sep 881 28-Sep 880 29-Sep 881 29-Sep 883 29-Sep 755 1-Oct 973 2-Oct 818 30-Sep 775 1-Oct 973 2-Oct 818 3-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 818 3-Oct 862 7-Oct 958 8-Oct 1033 9-Oct 1142 10-Oct 1130 12-Oct 1322 13-Oct 1322 14-Oct 1323 14-Oct 1423 14-Oct 182 <th>18-Sep</th> <th></th> <th></th> <th></th> | 18-Sep | | | |
| 21-Sep 1382 22-Sep 997 23-Sep 1055 24-Sep 1097 25-Sep 997 26-Sep 997 28-Sep 997 28-Sep 681 28-Sep 681 29-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 30-Sep 648 30-Sep 913 4-Oct 913 5-Oct 800 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1338 12-Oct 1302 13-Oct 1223 14-Oct 1123 | | | | |
| 22-Sep 997 23-Sep 1055 24-Sep 1401 25-Sep 997 26-Sep 990 27-Sep 881 28-Sep 888 29-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1029 6-Oct 1142 10-Oct 1156 11-Oct 1336 2-Oct 1392 13-Oct 1392 13-Oct 1123 14-Oct 1123 15-Oct 1821 16-Oct 1821 17-Oct 1943 18-Oct 1181 16-Oct 1821 17-Oct 1943 18-Oct 1820 19-Oct 1821 <th>21-Sep</th> <th></th> <th></th> <th></th> | 21-Sep | | | |
| 24-Sep 1401 25-Sep 997 26-Sep 990 27-Sep 851 28-Sep 888 29-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 800 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1142 10-Oct 1136 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1183 18-Oct 1882 19-Oct 1881 20-Oct 1882 21-Oct 1882 22-Oct 1882 23-Oct 1882 24-Oct 1882 22-Oct 1882< | 22-Sep | | | |
| 25-Sep 997 26-Sep 990 27-Sep 851 28-Sep 888 30-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1338 12-Oct 1392 13-Oct 1123 14-Oct 1123 15-Oct 182 11-Oct 1181 16-Oct 1445 17-Oct 1943 18-Oct 182 19-Oct 182 19-Oct 182 19-Oct 182 19-Oct 182 19-Oct 1820 22-Oct 1582 | 23-Sep | | | |
| 26-Sep 990 27-Sep 851 28-Sep 888 29-Sep 648 30-Sep 973 20ct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 956 8-Oct 1029 6-Oct 1029 6-Oct 1029 6-Oct 1029 10-Oct 1142 10-Oct 1142 10-Oct 1142 10-Oct 1186 11-Oct 1336 12-Oct 1322 13-Oct 1123 15-Oct 1181 16-Oct 1183 18-Oct 1831 19-Oct 1832 19-Oct 1831 20-Oct 1983 21-Oct 1820 22-Oct 1820 22-Oct 1582 23-Oct 1280< | 24-Sep | | | |
| 27-Sep 851 28-Sep 888 29-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1336 2-Oct 1323 11-Oct 1336 12-Oct 1923 14-Oct 1123 14-Oct 1123 15-Oct 182 14-Oct 182 15-Oct 182 19-Oct 182 19-Oct 182 19-Oct 182 19-Oct 182 19-Oct 1604 22-Oct 1694 22-Oct 1694 22-Oct 1694 22-Oct 1690 22-Oct 1690 | 25-Sep | | | |
| 28-Sep 888 29-Sep 648 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1136 11-Oct 1132 11-Oct 1123 11-Oct 1181 16-Oct 1182 18-Oct 1882 19-Oct 1845 17-Oct 1842 18-Oct 1820 20-Oct 1820 22-Oct 18 | | | | |
| 30-Sep 795 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 958 8-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1382 12-Oct 1392 13-Oct 123 14-Oct 1181 15-Oct 1181 16-Oct 1485 17-Oct 1943 20-Oct 1882 20-Oct 1694 21-Oct 1820 22-Oct 1520 23-Oct 1520 24-Oct 1133 22-Oct 1520 23-Oct 1520 24-Oct 1520 24-Oct 1133 25-Oct 1158 | | | | |
| 1-Oct 973 2-Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1142 11-Oct 1336 12-Oct 1336 13-Oct 1123 14-Oct 1181 15-Oct 1882 17-Oct 1943 18-Oct 1882 19-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1694 24-Oct 1582 23-Oct 1588 | | | | |
| 2.Oct 818 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1322 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1820 19-Oct 1821 20-Oct 1822 21-Oct 1820 22-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1199 26-Oct 1508 | | 795 | | |
| 3-Oct 890 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1392 13-Oct 1123 14-Oct 1123 15-Oct 1181 16-Oct 1882 17-Oct 1943 18-Oct 1882 19-Oct 1820 20-Oct 1694 21-Oct 1562 22-Oct 1562 23-Oct 1562 23-Oct 1562 23-Oct 1562 23-Oct 1562 23-Oct 1133 24-Oct 1139 25-Oct 1199 26-Oct 1508 | | | | |
| 4-Oct 913 5-Oct 1029 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1582 22-Oct 1588 25-Oct 1598 | | | | |
| 6-Oct 882 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 136 12-Oct 1392 13-Oct 1223 14-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1694 22-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1582 23-Oct 1580 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 7-Oct 958 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1882 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1582 22-Oct 1582 23-Oct 1694 22-Oct 1582 23-Oct 1508 | | | | |
| 8-Oct 1053 9-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1588 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 9-Oct 1142 10-Oct 1156 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1882 20-Oct 1894 21-Oct 1820 22-Oct 1862 21-Oct 1820 22-Oct 1882 23-Oct 1862 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 10-Oct 1156 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1882 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1582 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 11-Oct 1336 12-Oct 1392 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1582 22-Oct 1582 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 13-Oct 1223 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1582 23-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 14-Oct 1123 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1882 23-Oct 1582 23-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 15-Oct 1181 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | 13-Oct | 1223 | | |
| 16-Oct 1485 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 17-Oct 1943 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1882 23-Oct 1582 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 18-Oct 1882 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1882 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 19-Oct 1831 20-Oct 1694 21-Oct 1820 22-Oct 1582 23-Oct 1582 24-Oct 1133 25-Oct 1199 26-Oct 1508 | 18-Oct | 1882 | | |
| 21-Oct 1820 22-Oct 1582 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | 19-Oct | | | |
| 22-Oct 1582 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 23-Oct 1260 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 24-Oct 1133 25-Oct 1199 26-Oct 1508 | | | | |
| 25-Oct 1199 26-Oct 1508 | | | | |
| 26-Oct 1508 | | | | |
| 27-Oct 1460 | 26-Oct | 1508 | | |
| | 27-Oct | 1460 | | |



TABLE 5D-1 SHEET 4 OF 5SECONDARY TREATMENTCAPACITY ANALYSIS2020 TREATMENT REPORT6/2/07TR_5D.T001.07.06.02.cdr

| | | JIWWTP | |
|------------------|--------------------------------------|-----------------------|-----------------------|
| | Secondary Plant Capacity (w/Storage) | No. of Times Capacity | No. of Times Capacity |
| DATE | MGD | < 300 MGD | < 330 MGD |
| 28-Oct | 1620 | | |
| 29-Oct | 1620 | | |
| 30-Oct | 1620 | | |
| 31-Oct | 1620 | | |
| 1-Nov | 1620 | | |
| 2-Nov | 1180 | | |
| 3-Nov | 1108 | | |
| 4-Nov | 1036 | | |
| 5-Nov | 943 786 | | |
| 6-Nov 7-Nov | 540 | | |
| 8-Nov | 1234 | | |
| 9-Nov | 1196 | | |
| 10-Nov | 881 | | |
| 11-Nov | 940 | | |
| 12-Nov | 732 | | |
| 13-Nov | 585 | | |
| 14-Nov | 611 | | |
| 15-Nov | 598 | | |
| 16-Nov | 495 | | |
| 17-Nov | 325 | | 1 |
| 18-Nov | 342 | | |
| 19-Nov | 302 | | 1 |
| 20-Nov | 299 | 1 | |
| 21-Nov | 320 | | 1 |
| 22-Nov | 362 | | |
| 23-Nov | 429 | | |
| 24-Nov | 472 | | |
| 25-Nov | 399 | | |
| 26-Nov | 405 | | |
| 27-Nov | 464 | | |
| 28-Nov | 468 | | |
| 29-Nov | 445 | | |
| 30-Nov | 494 489 | | |
| 1-Dec 2-Dec | 441 | | |
| 3-Dec | 504 | | |
| 4-Dec | 467 | | |
| 5-Dec | 623 | | |
| 6-Dec | 764 | | |
| 7-Dec | 1050 | | |
| 8-Dec | 853 | | |
| 9-Dec | 667 | | |
| 10-Dec | 651 | | |
| 11-Dec | 500 | | |
| 12-Dec | 511 | | |
| 13-Dec | 521 | | |
| 14-Dec | 509 | | |
| 15-Dec | 475 | | |
| 16-Dec | 441 | | |
| 17-Dec | 370 | | |
| 18-Dec | 357 | | |
| 19-Dec | 440 | | |
| 20-Dec | 378 | | |
| 21-Dec | 450 | | |
| 22-Dec | 402 | | |
| 23-Dec | 466 | | |
| 24-Dec | 431 | | |
| 25-Dec | 427 | | |
| 26-Dec | 442 | | |
| 27-Dec | 619 | | |
| 28-Dec | 710 | | |
| 29-Dec | 780 | | |
| 20 Dee | 199 | | |
| 30-Dec | | | |
| 30-Dec 31-Dec | 641 | 20 | 44 |
| | | 32 362 | 14 362 |

NOTE:

1) Secondary plant capacity data is a calculated value from UWS, Daily/Weekly Operating Report (2005)



TABLE 5D-1 SHEET 5 OF 5SECONDARY TREATMENTCAPACITY ANALYSIS2020 TREATMENT REPORT6/2/07TR_5D.T001.07.06.02.cdr

Future Condition Process Air System

| 2 | | | | Capacity | , with Indica | ated # of Ur | nits On |
|---|----------------|------------------------|----------------------|----------------|---------------|--------------|---------|
| | | | | 1 | 2 | 3 | 4 |
| JIWWTP | 4 | Compressors @ | cfm each | 118,000 | 236,000 | 354,000 | 472,000 |
| SSWWTP ¹ | 4 | Blowers @ | cfm each | 37,500 | 75,000 | 112,500 | 150,000 |
| | | | | | | | |
| Current Regulations and Advisory Stand | ards | | | | | | |
| NR 110 Requirements ² | | | | | | | |
| Oxygen Demand: | 1. | 1 lb Oxygen/lb peak B | OD | | | | |
| Oxygen transfer efficiency ³ | | 7 % of total oxygen su | pplied is utilized i | n activated sl | udge proces | SS | |
| Mixing Requirements: | 2 | 0 cfm/1000 cf of aerat | ion volume for dif | fusers | | | |
| <u>10-States Standards⁴</u> | | | | | | | |
| Oxygen Demand: | 1. | 1 lb Oxygen/lb peak B | OD | | | | |
| Diffuser System sizing: | 20 | 0 % of design average | e day Oxygen den | nand | | | |
| Mixing Requirements: | None specified | | | | | | |

Air Requirement Analysis - Revised 2020 Baseline Condition

| | JIW | WTP | SSWWTP | | |
|---|-------------|-------------|-------------|--|--|
| | Average Day | Maximum Day | Maximum Day | | |
| BOD Wasteload (lb/day) ⁵ | 155,000 | 477,000 | 377,000 | | |
| Air Requirement Based on Oxygen Demand | | | | | |
| Oxygen Demand, lb/d | 170,500 | 524,700 | 414,700 | | |
| Oxygen Requirement, lb/d ³ | 1,389,717 | 4,896,244 | 2,666,678 | | |
| Air Requirement, lb/d (21% Oxygen) ⁶ | 6,617,698 | 23,315,447 | 12,698,466 | | |
| Air Demand, cfm ⁷ | 60,000 | 212,000 | 116,000 | | |
| Air Requirement Based on Mixing Requ | irement | | | | |
| Tank Volume ⁸ (MG) | | 48.05 | 34.88 | | |
| Air Requirement, cfm | | 128,000 | 93,000 | | |



NOTES:

1) Increased capacity of SSWWTP based on information provided in:

Donahue & Associates, Preliminary Engineering Report, South Shore Wastewater Treatment Plant Blower System Upgrade (October 2004).

2) Department of Natural Resources, Wisconsin Administrative Code, Volume 11, Chapter NR 110 (Revisor of Statutes Bureau, May 2001).

3) NR 110.21(5)(c)2 indicates that the 7% oxygen transfer efficiency value should only be used if specific design information is not available.

Specific design information is available at both JIWWTP and SSWWTP so the following information will be used instead.

At JIWWTP, based on information provided in Jones Island O&M Manual, 1996:

| | Average Day | Maximum Day |
|--|-------------|-------------|
| Oxygen Demand (lb/d) | 184,000 | 361,000 |
| Air Flow Rate (CFM) | 65,000 | 146,000 |
| Based on these values, | | |
| % Oxygen Transfer Efficiency calculated at | 12.27% | 10.72% |

At SSWWTP, based on information provided in *Technical Memorandum 1 Plant Loading and Process Air Flow Requirements* (July 2004) included in the SSWWTP Blower System Upgrade report referenced in Note 1, the 2001-2003 Oxygen Demand and Airflow Supply was as shown:

| | Average Day | Maximum Day |
|--|-------------|-------------|
| Oxygen Demand (lb/d) | 111,000 | 230,000 |
| Air Flow Rate (CFM) | 51,700 | 64,100 |
| Based on these values, | | |
| % Oxygen Transfer Efficiency calculated at | 9.31% | 15.55% |

4) Wastewater Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Recommended Standards for Wastwater Facilities (Health Education Services Division, 2004).

5) BOD wasteload is from Appendix 5C, MMSD System Revised 2020 Baseline Condition Mass Balance Analysis in Table 5C-2

(which lists average day conditions at both WWTPs) and Table 5C-5 (which lists maximum day wasteload conditions at both WWTPs)

6) Oxygen is only 21% of air so air requirement is proportionally larger than the oxygen requirement

7) Air density, at 60 deg F, equals 0.0763 lb/cf from Michael R. Lindeburg, Civil Engineering Reference Manual for the PE Exam, 7th Ed, (1999).

8) Appendix 4F, *MMSD WWTP Unit Process Analysis and Regulation Review*, Table 4F-7, *JIWWTP Unit Process No. 5: Secondary Flow Control/ Aeration System*, and Table 4F-39, *SSWWTP Unit Process No. 5: Aeration and RAS Pumping* Additional aerated channel (MLSS channels & Aerated Effluent Channels) volume at JIWWTP assumed to be 2 x largest basin

3.3 MG



Pickle liquor is used as needed, which is rarely. Therefore, did not calculate future usage.

SSWWTP

| Existing Condition Usage ¹ : | Average | 3.0 | gpm |
|---|---------|------|-----|
| | Maximum | 16.0 | gpm |

Assumed the increase in usage would be based on the increase in Revised 2020 Baseline influent flow projections

| | Average Day (MGD) | Maximum Day Flow (MGD) |
|--|-------------------|------------------------|
| Existing Influent Flow (1999-2003) ² : | 101.6 | 307 |
| Revised 2020 Baseline Influent Flow ² : | 115.7 | 300 |
| Therefore: | | |
| Revised 2020 Baseline Projected Usage: | Average 3.4 | gpm |
| | Maximum 16.4 | gpm |

NOTES:

1) Existing usage is from Table 4-F-50, SWWTP Unit Process No. 18: Pickle Liquor Storage and Feed in Appendix 4F, MMSD WWTP Unit Process Analysis and Regulation Review

2) Existing and Revised 2020 Baseline influent flow data are from Table 5A-1, Existing and Future Average and Peak Flows and Loads in Appendix 5A, Future Condition Flow and Wasteload Analysis



TABLE 5D-3 PICKLE LIQUOR REQUIREMENTS 2020 TREATMENT REPORT 6/2/07 TR_5D.T0003.07.06.02.cdr

APPENDIX 5E

PROJECTED CMAR RESULTS ANALYSIS



This analysis used the new CMAR review process as of 2004 and reviewed how MMSD would have been graded for the last five years of the existing condition review, 1999-2003.

| New CMAR Parameters Reviewed | Weight Assigned to Exceedence |
|--|-------------------------------|
| 1) Average Monthly Influent Flow Compared to Design Max Monthly Flow | |
| Number of times Ave Mo Flow Exceeded 90% of Design Flow | 2 |
| Number of times Ave Mo Flow Exceeded 100% of Design Flow | 1 |
| Average Monthly Influent BOD Compared to Design Average BOD (lb/d) | |
| Number of times Ave Mo BOD Exceeded 90% of Design Flow | 3 |
| Number of times Ave Mo BOD Exceeded 100% of Design Flow | 2 |
| Ave Mo BOD Calculation: Ave Mo Flow x Ave Mo BOD conc x 8.34 | |
| 3) Added Analysis: Average Monthly Influent TSS Compared to Design Average TSS (Ib/d) | |
| (This item is NOT reviewed in CMAR so is not included in grading) | |
| Number of times Ave Mo TSS Exceeded 90% of Design Flow | |
| Number of times Ave Mo TSS Exceeded 100% of Design Flow | |
| Ave Mo TSS Calculation: Ave Mo Flow x Ave Mo TSS conc x 8.34 | |
| 4) Average Mo. Effluent BOD Compared to Permit Limit | |
| Number of times Ave Mo BOD Exceeded 90% of Permit Limit | 3 |
| Number of times Ave Mo BOD Exceeded 100% of Permit Limit | 7 |
| 5) Average Mo. Effluent TSS Compared to Permit Limit | |
| Number of times Ave Mo TSS Exceeded 90% of Permit Limit | 3 |
| Number of times Ave Mo TSS Exceeded 100% of Permit Limit | 7 |
| 6) Average Weekly Effluent NH $_3$ Compared to Permit Limit (for South Shore only, see table)) | |
| Number of times Ave Weekly NH ₃ Exceeded 100% of Permit Limit | 2.5 |
| 7) Average Mo. Effluent P Compared to Permit Limit | |
| Number of times Ave Mo. P Exceeded 100% of Permit Limit | 10 |

Grade Determination - Total points generated were subtracted from 100 and grade assigned based on Table 1 in NR 208.

Sources:

1) Department of Natural Resources, Wisconsin Administrative Code, Volume 11, Chapter NR 208, Compliance Maintenance (Revisor of Statutes Bureau, November 2004).

2) UWS, Daily/Weekly Operating Reports (1999-2003)

3) Appendix 5A, Future Condition Flow and Wasteload Analysis, Table 5A-8, LeSaffre Yeast Data



JIWWTP

| | Influent Desig | No. of Influent Design Parameters/Effluent Limits Exceedances | | | | | | | | | | |
|-----------------------------------|-----------------|---|------|------|------|------|------|------|------|------|------|------|
| | Effluent Limits | | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | |
| | 90% | 100% | 90% | 100% | 90% | 100% | 90% | 100% | 90% | 100% | 90% | 100% |
| Influent Flow and Loading | | | | | | | | | | | | |
| Max Monthly Flow (MGD) | 144 | 160 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average Day BOD (lb/d) | 269100 | 299,000 | 4 | 2 | 3 | 1 | 4 | 1 | 1 | 0 | 0 | 0 |
| Average Day TSS (lb/d) | 282600 | 314,000 | 4 | 3 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 0 |
| Total Points Generated | | | 14 | 4 | 13 | 2 | 12 | 2 | 3 | 0 | 0 | 0 |
| Score | | | 8 | 2 | 85 | | 86 | | 97 | | 100 | |
| Section Grade | | | E | 3 | В | | В | | A | | A | |
| Effluent Quality and Plant Perfor | mance | | | | | | | | | | | |
| Monthly Ave BOD (mg/L) | 27 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Points Generated | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Score | | | 100 | | 100 | | 100 | | 100 | | 100 | |
| Section Grade | | | A | | A | | A | | A | | Α | |
| Monthly Ave TSS (mg/L) | 27 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Points Generated | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Score | | | 100 | | 100 | | 100 | | 100 | | 100 | |
| Section Grade | | | A | | A | | A | | A | | Α | |
| Monthly Ave Phosphorus (mg/L) | N/A | 1 | N/A | 0 |
| Total Points Generated | | | 0 | | 0 | | 0 | | 0 | | 0 | |
| Score | | | 100 | | 100 | | 100 | | 100 | | 100 | |
| Section Grade | | | A | | A | | Α | | A | | Α | |

NOTES:

LeSaffre Yeast

1) Review needs to take into account the closure of LeSaffre Yeast. The following yearly average day values were applied to the monthly averages since a lot of data was not readily available

| Flo | w (MGD) | Inf BOD (lb/d) | Inf TSS (lb/d) |
|-----|---------|----------------|----------------|
| | 0.80 | 34,000 | 8,000 |

Only applied the reduction to corresponding parameters when monthly averages exceeded the CMAR requirements. If already were below requirements, did not need to check that it met CMAR limits

2) No Ammonia limits at JIWWTP so did not include in grade

3) In December 2000, due to extenuating circurcumstances related to the Hoan Bridge Collapse, only the first 12 days of the month were averaged



SSWWTP

| 33WW1F | | | | | | | | | | | | |
|-----------------------------------|-----------------|---|---------|---------|------|------|------|------|------|------|-----|------|
| | Influent Desig | No. of Influent Design Parameters/Effluent Limits Exceedances | | | | | | | | | | |
| | Effluent Limits | | 1999 | | 2000 | | 2001 | | 2002 | | | 003 |
| | 90% | 100% | 90% | 100% | 90% | 100% | 90% | 100% | 90% | 100% | 90% | 100% |
| Influent Flow and Loading | | - | | | | | | | | | | |
| Max Monthly Flow (MGD) | 153 | 170 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average Day BOD (lb/d) | 201600 | 224,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average Day TSS (lb/d) | 239400 | 266,000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 3 |
| Total Points Generated | | | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Score | | | 9 | 8 | 98 | | 100 | | 100 | | 100 | |
| Section Grade | | | | Α | | 4 | | 4 | Α | | A | |
| Effluent Quality and Plant Perfor | mance | | | | | | | | | | | |
| Monthly Ave BOD (mg/L) | 27 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Points Generated | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Score | | | 100 100 | | 00 | 100 | | 100 | | 100 | | |
| Section Grade | | | A | | A | | A | | A | | A | |
| Monthly Ave TSS (mg/L) | 27 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Points Generated | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Score | ore | | 1 | 100 100 | | 100 | | 100 | | 100 | | |
| Section Grade | | | A | | A | | A | | A | | A | |
| Weekly Ave NH3 (mg/L) | N/A | See table | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 |
| Total Points Generated | | | | 0 | | 0 | | 0 | | 0 | | 0 |
| Score | | | 100 | | 100 | | 100 | | 100 | | 100 | |
| Section Grade | | - | A | | A | | A | | A | | A | |
| Monthly Ave Phosphorus (mg/L) | N/A | 1 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 |
| Total Points Generated | | | | 0 | | 0 | | 0 | | 0 | | 0 |
| Score | | | 100 | | 100 | | 100 | | 100 | | 100 | |
| Section Grade | A | | A | A | | Α | | A | | A | | |
| | | | | | | | | | | | | |

NOTE:

1) Ammonia limits at South Shore (for assumed 7.0 pH)

| June | 16.7 |
|-----------|------|
| July | 11.3 |
| August | 11.1 |
| September | 12.7 |

