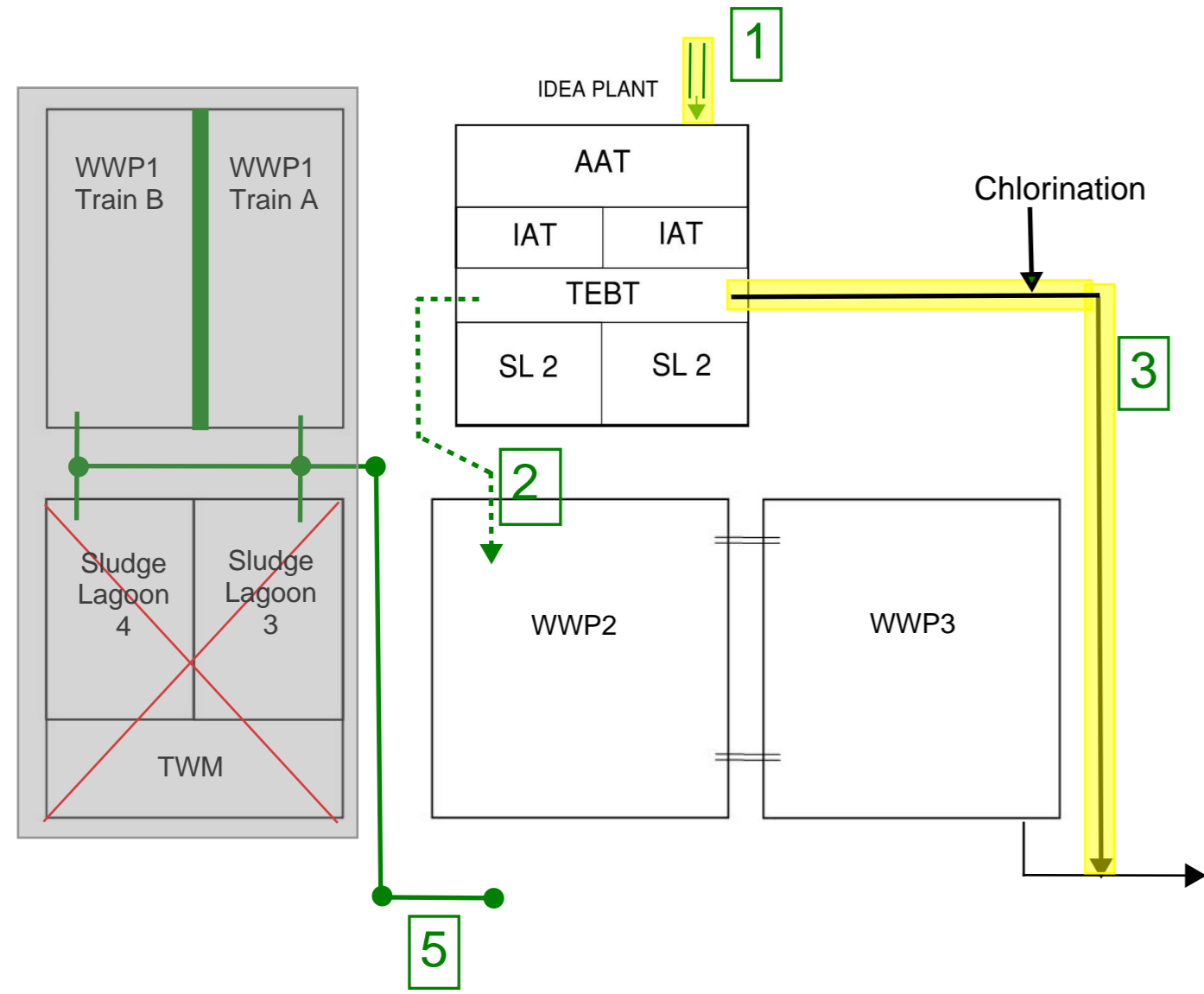
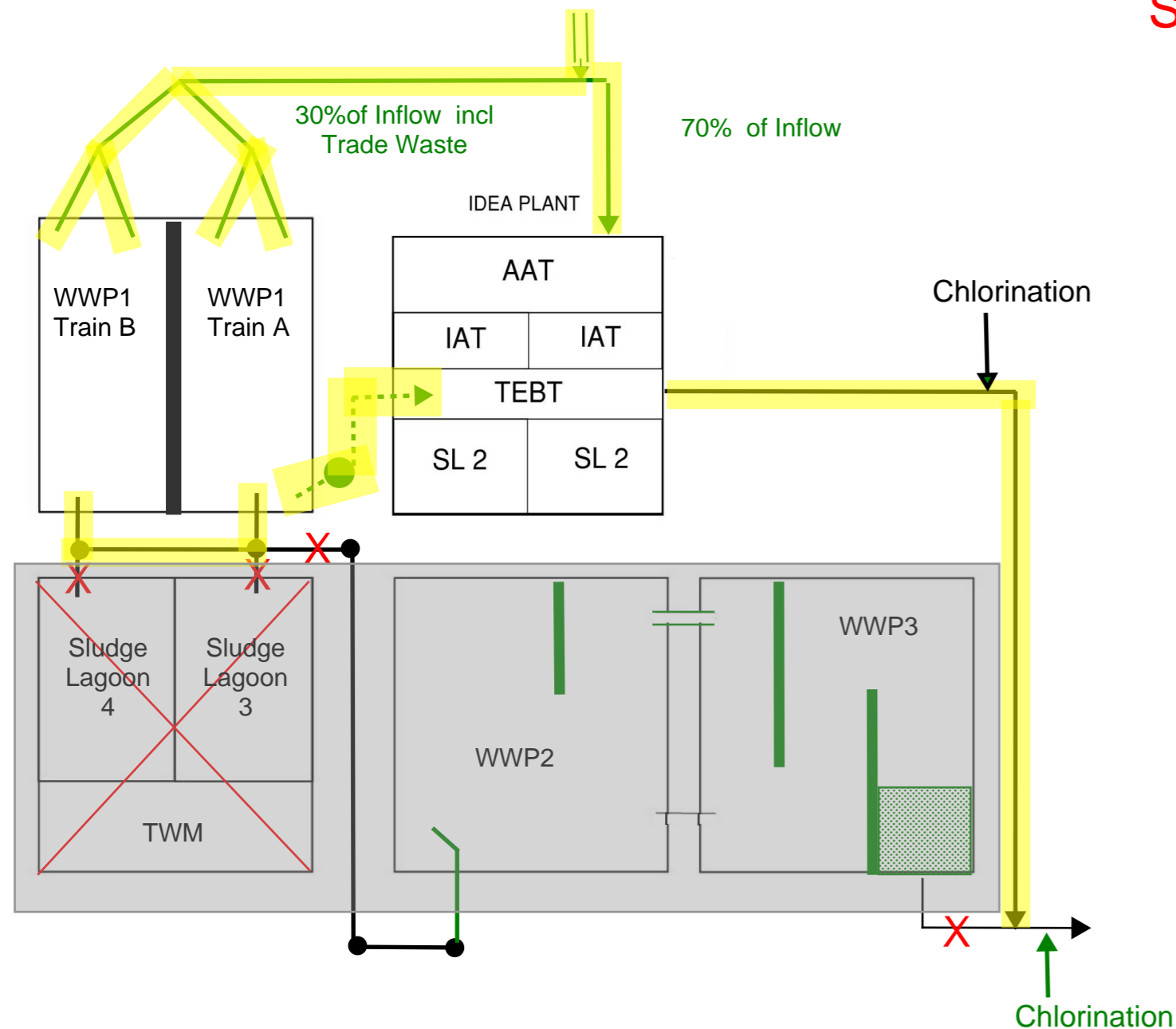


STAGE A - PRIMARY POND UPGRADE (ESTIMATE 16-20 WEEKS)



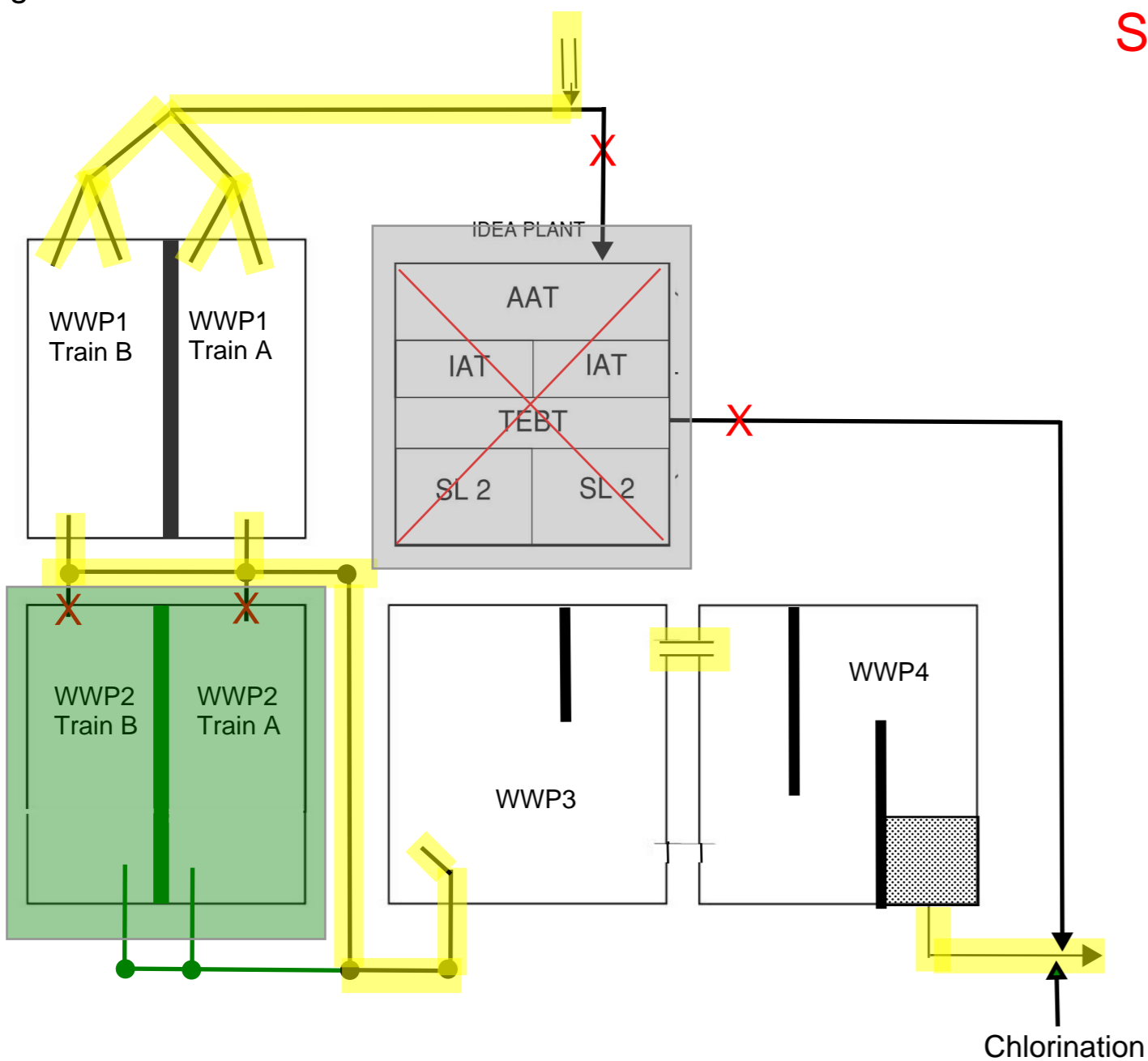
1. DURING WWP1 WORKS FULL SEWER INFLOW INCLUDING TRADE WASTE DISPOSAL DIRECTED TO IDEA PLANT. **IDEA PLANT DESIGN CAPACITY 8.0 ML/day.**
2. TWM POND EXCLUDED FROM WORKS; SLUDGE LAGOON 3 AND SLUDGE LAGOON 4 NORMAL OPERATION AS PART OF IDEA PLANT.
3. IDEA (TREATED EFFLUENT BALANCE TANK) OUTFLOW DIRECTED TO OLD BOULDER LAGOONS USING EXISTING TRANSFER PUMPS WITH TEMPORARY PUMP INSTALLATION FOR PEAK FLOW TRANSFER TO WWP2.
4. WWP1 OFFLINE (DRAIN & DRY) FOR UPGRADE CONSTRUCTION INTERNAL EMBANKMENT FOR DUAL TRAIN OPERATION. INCLUDES REFURBISHMENT OF ALL EXISTING EMBANKMENTS AND POND LINING TO DWER LICENSE SPECIFICATION.
5. INSTALL NEW GRAVITY FLOW PIPEWORK FROM WWP1 DUAL TRAINS TO WWP2, INCLUDING OPTIONAL PIPEWORK TO SLUDGE LAGOON AREAS FOR FUTURE POND CAPACITY (REFER STAGE C1).

STAGE B - SECONDARY AND TERTIARY POND UPGRADE [ESTIMATE 16-20 WEEKS]



1. 80% OF SEWAGE INFLOW WILL BE DIRECTED TO THE IDEA PLANT, PER NORMAL OPERATION.
2. AT COMMENCEMENT OF STAGE B WORKS THE PRIMARY PONDS WILL BE EMPTY. ASSUMING 20% OF 6.5 ML/day INFLOW AND ALL TRADE WASTE IS DIRECTED TO THE PRIMARY PONDS, WITH EVAPORATION LOSSES OF 8mm/day, THE REFURBISHED PONDS WILL FILL IN 80 DAYS WITHOUT DISCHARGE. A TEMPORARY PUMP MAY BE REQUIRED TO TRANSFER PARTIALLY TREATED POND EFFLUENT TO THE IDEA PLANT FOR DILUTION WITH IDEA EFFLUENT AND TRANSFER TO OLD BOULDER LAGOONS.
3. SECONDARY AND TERTIARY POND OFFLINE; REFURBISH OF EARTH FILL EMBANKMENTS AND CLAY LINING TO DWER LICENSE SPECIFICATION.
4. SECONDARY POND INLET INSTALLED WITH 45° BEND TOWARD SOUTHERN EMBANKMENT WITH STUB BAFFLE 60m LENGTH – HYDRAULIC CIRCULATION ACCORDING TO SHILTON & HARRISON (2003).
5. FINAL MATURATION POND INSTALLATION OF TWO 140m LONG BAFFLES AT EQUAL LONGITUDINAL SPACING. EXCAVATE AND INSTALL ROCK FILTER 8000m³ AT OUTLET. LOWER OUTLET PUMP STATION SET POINT FOR TOP WATER LEVEL AT 1.3m WATER DEPTH FOR ENTIRE MATURATION POND.

Stage C1- IDEA Plant redundant



STAGE C- IDEA PLANT OFFLINE – C1 REFURBISH PONDS, OR C2 REFURBISH IDEA PLANT [ESTIMATE 10 - 26 WEEKS]

REDUCED CAPACITY PERIOD DURING MAINTENANCE & UPGRADES ONLY: 3 PONDS AT 6.5 ML/day CAPACITY DURING WARMER MONTHS OCTOBER – MARCH (AVERAGE DAILY TEMPERATURE >22°C); CHLORINATION REQUIRED FOR FINAL PATHOGEN TREATMENT APRIL– SEPT (AVERAGE DAILY TEMPERATURE <22°C). REFER TABLES 1 & 2. TOTAL DETENTION TIME 29.3 DAYS.

1. **OPTION C1:** SHOULD ASSET CONDITION ASSESSMENT OF THE IDEA PLANT IDENTIFY INFEASIBLE REFURBISHMENT COSTS, THE IDEA PLANT CAN BE CLASSIFIED AS REDUNDANT TO SERVICE DWER LICENSE CAPACITY OF 8.0 ML/day.
2. CURRENT SLUDGE LAGOONS 3 & 4, AND TWM POND TO BE REFURBISHED TO DUAL TRAIN SECONDARY PONDS WITH CONSTRUCTION OF NEW INTERNAL EMBANKMENT. TREATMENT CAPACITY AT 8.0 ML/day IS SHOWN IN TABLE 3. CHLORINATION WILL BE REQUIRED AT ENVIRONMENTAL AND RECYCLED WATER DISCHARGES DURING MAY – SEPTEMBER.
3. WWP2 & WWP3 MATURATION PONDS WILL BE RELABELLED WWP3 & WWP4, RESPECTIVELY.

TABLE 1. WASTEWATER POND DESIGN FOR 6.5 ML/day AT DAILY TEMPERATURE 22.0°C, pH 8.0

	BOD	TN	E.coli	pH	TSS
Unit	mg/L	mg/L	cfu / 100mL	-	mg/L
Influent sewage	300.0	72.0	1.0E+06	N/A	N/A
WWP 1A & WWP 1B	35.0	34.0	1.49E+05		
WWP2	3.0	16.8	1.25E+04		
WWP3	0.6	8.27	871		
DWER L8650 Table 2.2.2 (June 2016)	<15	N/A	<1000	5 – 9	<40
Health Approval EHB-01163 (Nov 2010)*	N/A	N/A	<1000	6.5 – 8.5	<30

* Dept of Health approval EHB-01163 requires chlorine residual 0.2 – 2.0 mg/L
Nitrogen reduction based on pH 8.0 as typical low value based on WWTP DWER sampling results.

4. **OPTION C2:** IF COST EFFECTIVE, REFURBISH IDEA PLANT INCLUDING SLUDGE LAGOONS 1, 2, 3 & 4. TWM POND NOT REQUIRED BUT COULD BE UTILISED FOR SLUDGE MANAGEMENT.
5. IDEA PLANT REFURBISHMENT AT 8.0 ML/day PLUS REFURBISHED PONDS CAPACITY AT 6.5 ML/day, INCLUDING CHLORINATOR AT DISCHARGE, WOULD PROVIDE TOTAL 14.5 ML/day CAPACITY.

ITEMS SHOWN IN GREEN ARE UNDER CONSTRUCTION IN THE CURRENT STAGE OF WORKS; NON-OPERATIONAL PLANT IS SHADED GREY. PIPEWORK HIGHLIGHTED YELLOW IS THE TREATMENT PLANT HYDRAULIC FLOWPATH FOR THE STAGE OF WORKS SHOWN.

