West Basin Facility Plan Project 7054

TECHNICAL MEMORANDUM 16

Rock Creek Implementation Plan

FINAL / September 2025

Produced by: carollo

Clean Water Services

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TM 16 - ROCK CREEK IMPLEMENTATION PLAN

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Abbreviations

AB	aeration basin
ADW	average dry weather
CAMP®	Concentrated Accelerated Motivated Problem-Solving
CCB	chlorine contact basin
CIP	capital improvements program
District	Clean Water Services
GBT	gravity belt thickener
GMF	granular media filter
gpm/sf	gallons per minute per square foot
GT	gravity thickener
HLR	hydraulic loading rate
HRT	Hydraulic retention time
lb/hr/unit	pounds per hour per unit
MDWW	max day wet weather
mg/L	milligrams per liter
MHWW	max hour wet weather
MMDW	max month dry weather
MMWW	max month wet weather
PC	primary clarifier
PE	primary effluent
ppd/sf	pounds per day per square foot
PS	pump station
RAS	return activated sludge
SC	secondary clarifier
SLR	solids loading rate
TC	tertiary clarifier
TM	technical memorandum
TN	total nitrogen
TP	total phosphorus
TSS	total suspended solids
UFAT	unified fermentation and thickening
VFA	volatile fatty acid
WAS	waste activated sludge
WASSTRIP	waste activated sludge stripping to recover internal phosphate
WRRF	Water Resource Recovery Facility

TM 16 ROCK CREEK IMPLEMENTATION PLAN

16.1 Background

The capacities of existing unit processes at the Rock Creek Water Resource Recovery Facility (WRRF) were established in Technical Memorandum (TM) 2[1]. Additional, more detailed, evaluations were conducted of the grit removal[2], secondary treatment[3], tertiary treatment[4], digestion[5], and odor control[6] processes, the solids transfer pipeline[7], and hydraulic capacity[8]. This memorandum presents the recommended implementation plan to address capacity and condition-related limitations identified during the planning process and to provide the required capacity through the 2045 planning horizon. The plan includes preliminary project scopes, planning-level cost estimates, and required site space.

16.2 Summary

As part of the capacity analysis completed for the Rock Creek WRRF, the capacities of the following unit processes were evaluated through the 2045 planning period and buildout:

- Influent pumping.
- Headworks.
- Primary clarification.
- Secondary treatment.
- Tertiary treatment.
- Disinfection.
- Anaerobic digestion.
- Primary sludge thickening.
- Waste activated sludge (WAS) pre and post-thickening.
- Dewatering.
- Biosolids storage.
- Phosphorus recovery or waste activated sludge stripping to recovery internal phosphate (WASSTRIP).

[1] Carollo Engineers, Inc. (2025). TM 2 - Rock Creek Capacity Evaluation, West Basin Facility Plan Project 7054.
[2] Carollo Engineers, Inc. (May 2024). TM 3 - Rock Creek Grit Removal Alternatives Analysis, West Basin Facility Plan Project 7054.
[3] Carollo Engineers, Inc. (Mar 2023). TM 4 - Rock Creek Secondary Treatment Expansion, West Basin Facility Plan Project 7054.
[4] Carollo Engineers, Inc. (Nov 2024). TM 5 - Rock Creek WRRF Tertiary Expansion Evaluation, West Basin Facility Plan Project 7054.
[5] Carollo Engineers, Inc. (August 2025). TM 6 - Rock Creek Digester Capacity Evaluation, West Basin Facility Planning Project 7054.
[6] Carollo Engineers, Inc. (June 2025). TM 7 - Rock Creek WRRF Odor Control Evaluation, West Basin Facility Planning Project 7054.
[7] Carollo Engineers, Inc. (April 2024). TM 8 - Dedicated Solids Transfer Pipeline Evaluation, West Basin Facility Planning Project 7054.
[8] Carollo Engineers, Inc. (September 2025). TM 9 - Rock Creek Hydraulic Analysis, West Basin Facility Planning Project 7054.

Table 16.1 provides a summary of the projects identified as necessary to provide capacity at the Rock Creek WRRF through the planning and buildout periods. Unit processes not listed were determined to have sufficient capacity through buildout.

Table 16.1 Summary of Recommended Projects

Project		Driver	Parameter	Year Online	Project Cost (2025)	Description
1	Grit Removal	Condition/ Capacity	ADW	2029	$4M	New grit washing equipment
2	Tertiary Filters Phase 1	Capacity	MMDW	2030	$50M	+4 GMFs and support facilities
3	Secondary Expansion 1	Capacity	MMDW	2032	$80M	+1 AB, 1 SC, RAS/WAS PS, blower capacity, and PE PS expansion
4	Disinfection	Capacity	MHWW	2036	$20M	+CCB4
5	Digestion	Capacity	ADW	2034	$40M	+1 digester and support facilities
6	Dewatering	Capacity	MMDW	2040	$3M	+1 centrifuge
7	WASSTRIP	Capacity	MMDW	2040	$6M	+1 WASSTRIP tank
8	Secondary Expansion 2	Capacity	MMDW	2041	$60M	+1 AB, 1 SC, blower building, and RAS/WAS PS and PE PS capacity
9	Tertiary Filters Phase 2	Capacity	MMDW	2045	$30M	+4 GMFs
10	Primary Sludge Thickening	Capacity	ADW	Buildout	--	+2 GTs
11	Secondary Expansion 3	Capacity	MMDW	Buildout	--	+2 ABs, 1 SC, PE PS, RAS/WAS PS capacity
12	Tertiary Treatment	Capacity	MMDW	Buildout	--	+4 GMFs, associated support facilities, and conversion of SCs 5 and 6 to TCs
13	WAS Post Thickening	Capacity	MMWW	Buildout	--	+1 GBT
14	Screening	Capacity	MDWW	Buildout	--	+1 screen
15	Digestion	Capacity	MMWW	Buildout	--	+1 digester
16	Primary Clarification	Capacity	MHWW	Buildout	--	+1 PC

Notes:
AB - aeration basin; ADW - average dry weather; CCB - chlorine contact basin; GBT - gravity belt thickener; GMF - granular media filter; GT - gravity thickener; MDWW - max day wet weather; MHWW - max hour wet weather; MMDW - max month dry weather; MMWW - max month wet weather; PC - primary clarifier; PE - primary effluent; PS - pump station; RAS - return activated sludge; SC - secondary clarifier; TC - tertiary clarifier.

16.3 Recommended Improvements

An electrical master plan is currently being completed by others. As such, individual projects and associated costs shown in this plan do not reflect necessary electrical improvements.

16.3.1 Preliminary Treatment

Grit Removal - The existing grit removal system is in need of replacement due to both capacity and condition limitations. As part of the detailed evaluation of the grit system, it was recommended that the

existing equipment be replaced with two WEMCO Hydrogritters. Estimated project costs reported in this plan are based on implementation of this recommendation.

Screening - There is sufficient capacity in the existing screening process through the planning period. However, an additional screen will be required prior to buildout and is anticipated to be installed in an existing channel.

16.3.2 Primary Treatment

Primary Clarification – With the addition of the fourth clarifier, commissioned in March 2025, the primary clarification process will have sufficient capacity to handle projected flow and loads through the planning period. An additional primary clarifier will be required within the buildout phase.

16.3.3 Secondary Treatment

Within the planning period, there is potential for total nitrogen limits to be imposed at the Rock Creek WRRF. Currently, the existing aeration basins achieve some total nitrogen (TN) removal. However, if future TN limits are permitted, sidestream treatment may be required and/or the current secondary process may need to be redesigned to provide additional TN removal which may result in additional Capital Improvements Program (CIP) projects and/or accelerate the timeline for the secondary expansion projects described below. Additionally, the District plans to test the sludge densification process, InDense, which could improve biological nutrient removal and sludge settleability, potentially delaying the timing of the secondary expansion projects. While not driven directly by growth, modification/expansion to the existing RAS/WAS pump station on the east secondary treatment train may also be required within the planning period, based on the results on an ongoing evaluation by the District's process team.

Secondary Expansion 1 - An expansion of the secondary treatment process is necessary by the year 2032 to meet MMDW conditions. This expansion would include a new aeration basin, secondary clarifier, and RAS/WAS pump station, increased blower capacity within the existing blower building, and an expansion to the existing primary effluent pump station.

Costs for this expansion were based on the assumption that the new aeration basin will be configured similarly to existing Aeration Basins 6 and 7.

Given the site constraints, it is recommended that within this first phase expansion of the secondary process, the configuration and construction of all the remaining aeration basins and secondary clarifiers required through the buildout phase should be evaluated.

Secondary Expansion 2 - An additional aeration basin, secondary clarifier, new blower building, and expanded RAS/WAS pump station capacity will be required to treat MMDW conditions by the year 2041. As with the Secondary Expansion 1, estimated project costs assume that the new aeration basin will be configured similarly to Aeration Basins 6 and 7.

Secondary Expansion 3 - Two additional aeration basins, a new secondary clarifier and additional blower capacity will be required within the buildout period. The space identified on the site for Secondary Clarifier 13 that will be required in this expansion phase likely falls within the vegetated corridor to the east of the operating site and will require additional permitting efforts as well as additional cost for associated enhancement/restoration efforts that may be required.

16.3.4 Tertiary Treatment

The total number of filters required on site is driven by multiple variables, including the total phosphorus (TP) concentration limit, the total suspended solids (TSS) mass load limits, and the reuse demand. The evaluation of the tertiary treatment system considered multiple scenarios for TP limits at Rock Creek WRRF. Although the District currently operates under a Mutual Agreement and Order that allows discharge of higher effluent TP concentrations, the permitted limit remains at 0.1 milligrams per liter (mg/L), and this more stringent limit was assumed for planning purposes. If the limit is revised to 0.5 mg/L TP, the timing of related improvement projects could be deferred. Additionally, beginning in 2025, the District will begin pilot- and full-scale testing of the tertiary filtration process to confirm maximum filter loading rates, evaluate the ability to filter effluent from the Actiflo system, and assess the need for pretreatment. The results of this testing may influence the scope and timing of the tertiary projects discussed below.

It should also be noted that although cloth disk filters were not identified as a preferred option for tertiary expansion at Rock Creek WRRF, if the TSS mass load limit is revised, the District may reevaluate this technology.

Tertiary Filters Phase 1 - Three new GMFs are required by 2030 to meet MMDW conditions, based on a hydraulic loading rate (HLR) of 4 gallons per minute per square foot (gpm/sf). Over the planning period, a total of eight additional filters will be needed on the east side of the facility, assuming no pretreatment is implemented. The logical footprint for these filters extends into the vegetated corridor, increasing the complexity of permitting and construction. To help minimize these challenges, it is recommended that four filters be constructed as part of this first tertiary expansion phase.

A new filter support structure, including backwash supply and air scour equipment and improvements to the existing backwash waste equalization system have been included in this project scope and estimated costs.

Tertiary Filters Phase 2 - Another four GMFs are required by 2045 to meet MMDW conditions, driven by an assumed solids loading rate (SLR) of 0.45 pounds per day per square foot (ppd/sf).

Tertiary Treatment - Within the buildout period, additional tertiary capacity will be required. Following the tertiary expansion phases 1 and 2, space on the east side of the facility for logical expansion of the granular media filtration process will be limited, thus the next expansion of the tertiary treatment capacity has been shown on the west side of the facility.

The preliminary scope of this expansion will include rehabilitation of four granular media filters and flocculation and coagulation basins as well as conversion of Secondary Clarifiers 5 and 6 back to tertiary clarifiers. A new backwash surge basin will be required, and it is anticipated that new filtration support processes like backwash pumps and air scour will be housed in the filter gallery. Whether or not this is feasible should be investigated further during the predesign process.

Disinfection – The addition of CCB 4, will be required to treat 2036 MHWW flow conditions, assuming a hydraulic retention time (HRT) of 10 minutes. Estimated costs for this project assume a concrete structure similar to CCB 3 and that any additional chemical dosing equipment will be installed in the existing chemical building. The sequencing of the construction of this structure will need to be coordinated with the modifications to the east primary effluent bypass line. This project may also be coordinated with the tertiary filter expansion project as that will occur in the same vicinity. Increasing the chlorine dose under

MHWW flows may extend disinfection capacity to allow this project to be completed with the second phase tertiary filter expansion. As with the new GMFs, this structure will extend into the vegetated corridor and potentially the 100-year flood plain, increasing the complexity of permitting and construction.

16.3.5 Solids Handling

Primary Sludge Thickening - If the existing primary thickening process is operated in unified fermentation and thickening (UFAT) mode, two additional gravity thickeners will be required under MMDW flow and load conditions in 2029. However, if the process is run in a hybrid manner, with only half of the process operating in UFAT mode, expansion will not be required until 2045. At that point, the process will be capacity-limited under ADW conditions, assuming redundancy criterion of one unit out of service, one unit in thickening mode and the remaining units in UFAT mode.

The District has plans to conduct testing of the primary sludge thickening process to confirm existing capacity and evaluate the impacts of sludge heating on volatile fatty acid (VFA) production. As a result, this project has been deferred beyond the planning period pending the outcome of that testing.

Digestion - The existing digestion system will reach its reliable capacity to treat solids under ADW conditions with the largest unit out of service by 2034, at which point an additional mesophilic digester and associated support facilities will be required to maintain status quo solids management. One additional mesophilic digester will be required within the buildout period.

Dewatering - An additional centrifuge will be required by 2040 to accommodate MMDW conditions. The estimated costs for this project assume installation of a new centrifuge within the existing building and based on the previous project, includes some cost to account for the addition of seismic support.

WASSTRIP - The WASSTRIP process will require additional tankage to treat MMDW conditions in 2040, based on an HRT of 24 hours. The preliminary scope of this project includes the conversion of the existing centrate tank to a WASSTRIP tank, due to its proximity to the existing WASSTRIP tank, and construction of a new centrate tank further to the south.

Increased VFA generation will shorten the HRT required in the WASSTRIP tank, potentially delaying the need for additional tankage. Therefore, the results of the previously noted testing on the impacts of sludge heating on VFA production should be considered.

WAS Post Thickening - An additional gravity belt thickener will be required within the buildout phase. It is anticipated that this equipment will be installed in the existing building.

These recommended improvements will provide required capacity through the 2045 planning period and buildout. The future process flow diagram is shown in Figure 16.1 and the hydraulic profile at 2045 MHWW flows with new processes included is shown in Figure 16.2.

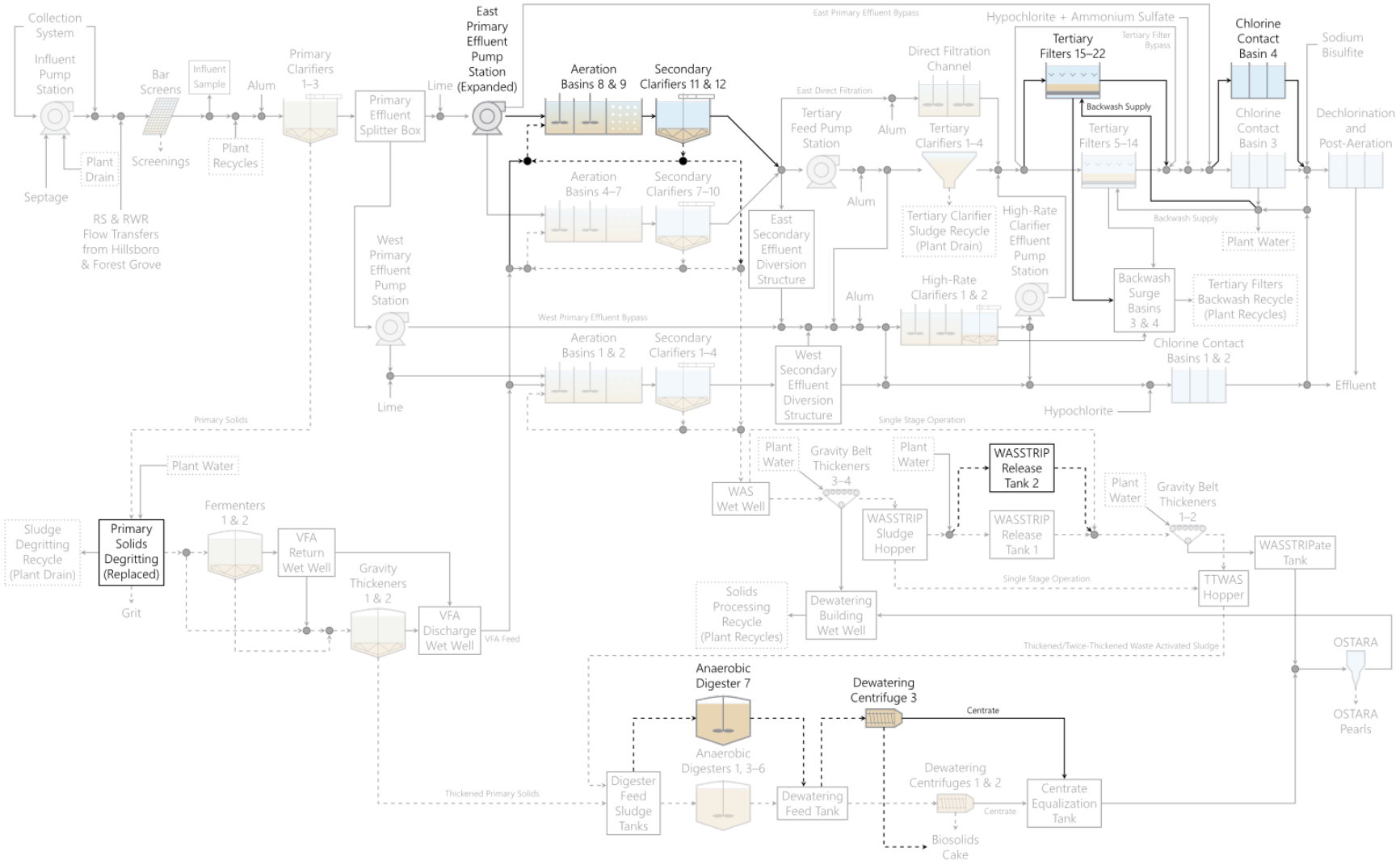

Figure 16.1 Rock Creek WRRF Simplified Process Flow Diagram

AB NO. 6 & 7 WEIR ELEVATIONS			
ZONE 1-2	160.06	ZONE 5-6	158.90
ZONE 2-3	158.90	ZONE 6-7	158.90
ZONE 3-4	158.90	ZONE 7-8	158.50
ZONE 4-5	158.90	ZONE 8-9	158.50

NOTES:

X | Y — 2045 PEAK HOUR FLOW (PHF)

X = NUMBER OF UNITS IN SERVICE

Y = WATER SURFACE ELEVATION

1 | 163.39 — WIER EL 163.0 — EL 166.00

- | 159.02 — EL 163.44

1 | 159.98 — (1) 72" PE — (1) 84" FROM PC 4 — EL 141.0

1 | 158.82 — EL 163.5 — EL 151.0

1 | 158.38 — PE BYPASS WEIR EL 158.00 — 72" PE (3) — EL 141.0

6 | 160.44 — EL 162.50

6 | 159.23

6 | 158.52 — WEIR CREST 158.67 — EL 155.92

6 | 156.22 — V-NOTCH WEIR, EL 156.08 — EL 159.00

6 | 155.06

APPROXIMATE EXISTING GRADE, TYP

84" PE

72" RS

90 — 120

EL 77.0

EXISTING RAW SEWAGE PUMP STATION

NEW CIRCULAR 140' PRIMARY CLARIFIER NO. 4

NEW PE COLLECTION MANHOLE

PE DIVERSION STRUCTURE

FLOW DISTRIBUTION STRUCTURE (NEVADA BOX)

PE BYPASS CHANNEL

AERATED EFFLUENT CHANNEL

PARSHALL FLUME

SECONDARY CLARIFIERS NO'S 7 THRU 12

TO SECONDARY EFFLUENT JUNCTION BOX

EAST PRIMARY EFFLUENT BYPASS TO EAST CHLORINE CONTACT BASIN

EAST PRIMARY EFFLUENT PUMP STATION

EAST AERATION BASIN NO 4 THRU 9 (STEP FEED)

YEAR 2045: FLOWS (MGD) AND RIVER LEVEL (FT)		
	INFLUENT FLOW	RIVER WATER SURFACE
PHF	217	143.6 (100-YR FLOOD)

SECONDARY TREATMENT FLOW SPLIT (MGD)			
	WEST	EAST	BYPASS
PHF	32	128	57

RAS FLOW RATE ASSUMPTIONS		
	WEST 4 PUMPS @ 5 MGD, 20 MGD MAX	EAST 6 PUMPS 11.6 MGD PER BASIN
PHF	19.2	69.6

3 | 173.50

TRANSFER FROM ALOHA NO. 3 PUMP STATION

(2) 54"RS

EL 178.50

BAR SCREEN

(2) 24" TRANSFER FROM HILLSBORO/ FOREST GROVE WWTP

3 | 165.59 — ELEVATION VARIES — WEIR EL 163.0 — EL 166.0

1 | 164.93 — ADJUSTABLE WEIR — EL 163.0

72" PE

1 | 164.18 — 84" PE — OVERFLOW @157.80 — EL 166.25 — 20" — EL 144.0 — 60" PE BYPASS

WEST PE BYPASS

1 | 160.36

1 | 163.74

2 | 162.95

2 | 161.85 — 2 | 158.64 — EL 164.50 — WEIR EL 161.50 — 48" ML — 60" ML

- | 157.14 — EL 158.5

- | 156.00 — WEIR CREST 156.00 — 30" SECONDARY CLARIFIER INFLUENT

4 | 154.95 — WEIR CREST 154.80 — EL 156.5

4 | 154.58

1 | 150.95 — EL 156.5 — 30" — 42" — TO JUNCTION BOX 2 — EL 143.0

TO CLARIFIER 5/6

0 | - — EL 153.75 — WEIR CREST 151.90

1 | 149.00 — EL 153.75 — EL 133.25

FROM JUNCTION BOX 1

HEADWORKS

CIRCULAR 140' PRIMARY CLARIFIER NO'S 1, 2 & 3

EFFLUENT BOX CLARIFIER 1 AND 2

EFFLUENT BOX CLARIFIER 3

PRIMARY EFFLUENT DISTRIBUTION STRUCTURE

WEST PRIMARY EFFLUENT PUMP STATION

SELECTOR

WEST AERATION BASINS NO'S 1 & 2

SECONDARY CLARIFIER INFLUENT DISTRIBUTION BOX

SECONDARY CLARIFIERS NO'S 1 THRU 4

JUNCTION BOX 1

CLARIFIERS 5/6

JUNCTION BOX 2

FIGURE 16.2A

ROCK CREEK 2045 PHF - 217 MGD

PLANT HYDRAULIC PROFILE

carollo

C:\pw_working\carollo_200000\d0353520\200908_FIGURE 9.1 10-15-25 08:12am aricardo XREFS: 200908_HYDRAULIC PROFILES

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Figure 16.2A Rock Creek 2045 PHF – 217 mgd Plant Hydraulic Profile

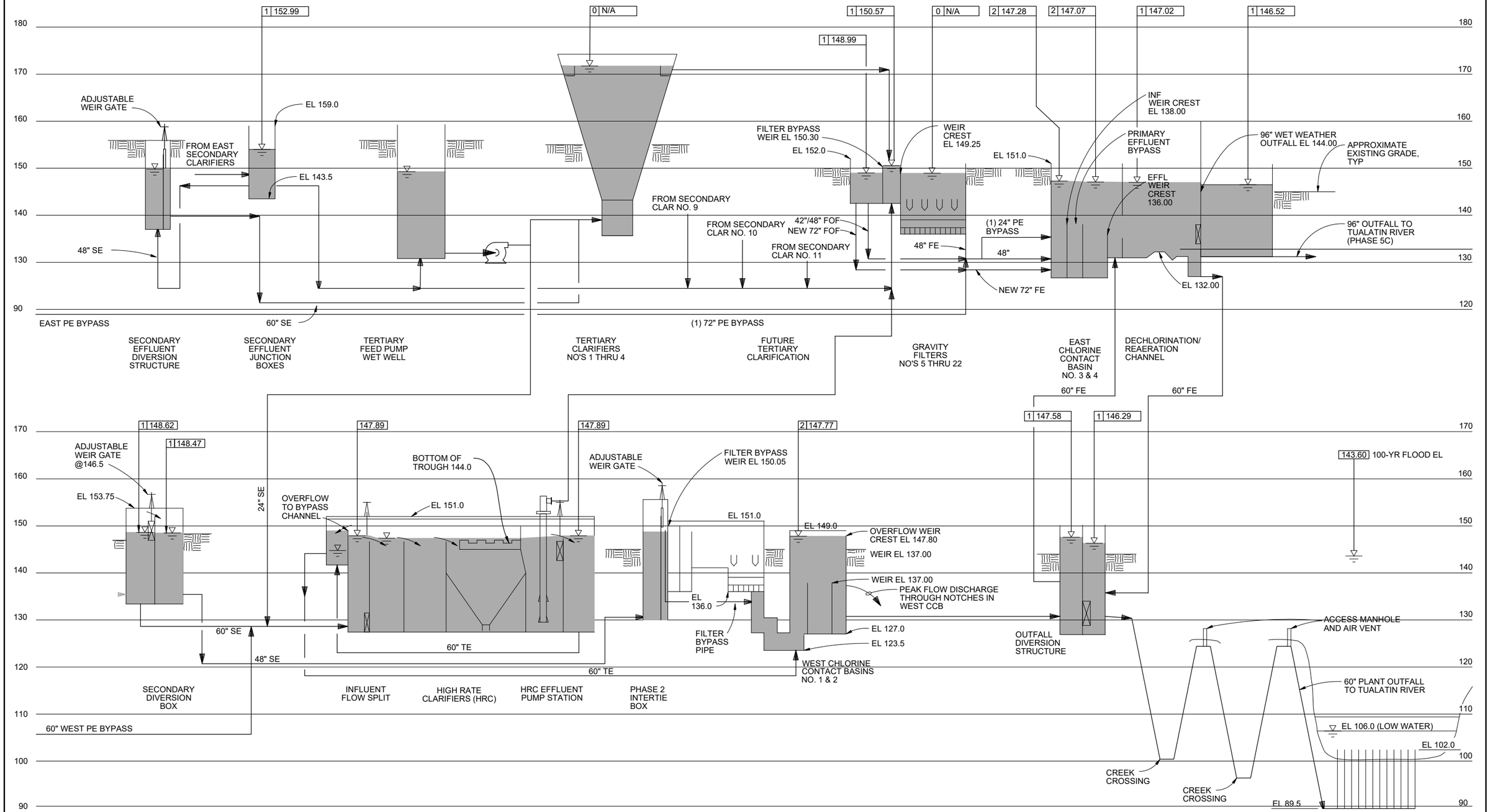

FIGURE 16.2B
ROCK CREEK 2045 PHF - 217 MGD
PLANT HYDRAULIC PROFILE

C:\pw_working\carollo_200000\d0353520\200908_FIGURE 9.2 10-15-25 10:29am aricardo XREFS: 200908_HYDRAULIC PROFILES

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Figure 16.2B Rock Creek 2045 PHF – 217 mgd Plant Hydraulic Profile

16.4 Planning Level Cost Estimate

The estimated project costs have been developed for the project within the planning period, identified in Table 16.1. These estimates are based on Association for the Advancement of Cost Engineering Class 5 cost estimates. Class 5 estimates are generally prepared based on very limited information and consequently have wide accuracy ranges. For these estimates, engineering is typically from 0 percent to 2 percent complete. The estimate is intended for strategic planning purposes, market studies, assessment of viability, project location studies, and long-range capital planning only. These costs estimates were developed using stochastic estimating methods such as cost curves, capacity factors, and other parametric techniques. The expected accuracy ranges are from -20 percent to -50 percent on the low side and +30 percent to +100 percent on the high side. Ranges could exceed those shown in unusual circumstances.

Project markup factors applied to each estimated cost are shown in Table 16.2 and the project costs, in 2025 dollars, are shown for each project in Table 16.3.

Table 16.2 Project Cost Markup Factors

Parameter	Value	Notes/Reference
Contingency	30%	West Basin Alternatives CAMP®
Contractor General Conditions	10%	West Basin Alternatives CAMP®
Contractor Overhead and Profit	12%	West Basin Alternatives CAMP®
Engineering, Legal and Administration	20%	West Basin Alternatives CAMP®

Table 16.3 2045 CIP Cost Summary

Project		Preliminary Scope	Estimated Project Cost (2025)
1	Grit Removal	▪ Replace existing equipment with Hydrogritter degritting equipment.	$4M
2	Tertiary Filters Phase 1	▪ Granular media filters 15-18. ▪ Filter support structure containing backwash supply and air scour equipment.	$50M
3	Secondary Expansion 1	▪ Aeration Basin 8. ▪ Secondary Clarifier 11. ▪ New RAS/WAS pump station. ▪ Expansion of the existing primary effluent pump station. ▪ New blower in the existing blower building.	$80M
4	Digestion	▪ New mesophilic digester. ▪ New digester control building.	$40M
5	Disinfection	▪ Chlorine Contact Basin 4. ▪ Chemical storage and metering equipment installed within the existing chemical building.	$20M
6	Dewatering	▪ One new centrifuge of equal capacity to existing installed within the existing dewatering building.	$3M

Project		Preliminary Scope	Estimated Project Cost (2025)
7	WASSTRIP	▪ Conversion of centrate tank to WASSTRIP tank. ▪ New centrate tank of equal size to existing.	$6M
8	Secondary Expansion 2	▪ Aeration Basin 9. ▪ Secondary Clarifier 12. ▪ RAS/WAS pump station capacity. ▪ Primary effluent pump station capacity.	$60M
9	Tertiary Filters Phase 2	▪ Granular media filters 19-22.	$30M

16.5 Project Schedule and Triggers

For each of the unit processes evaluated, trigger plots were developed based on unit process design criteria and flow and load projections provided by the District[9]. Table 16.4 summarizes trigger conditions associated with each of the identified improvements and shows the "trigger year" or the year the completed project is required to maintain required capacity.

Table 16.4 Planning Period Project Triggers

Project	Driver	Flow Condition	Redundancy	Trigger Year	Evaluation
Grit Removal	Condition/Capacity	ADW	One unit out of service	2029	TM2, TM3
Tertiary Filters Phase 1	Capacity (HLR = 4 gpm/sf)	MMDW	All units in service	2029	TM2, TM5
Secondary Expansion 1	Capacity	MMDW	SCs 5 and 6 out of service	2032	TM2, TM4
Digestion	Capacity	ADW	Largest unit out of service	2034	TM2, TM6
Disinfection	Capacity (HRT = 10 minutes)	MHWW	All units in service	2036	TM2
Dewatering	Capacity (SLR = 4500 lb/hr/unit)	MMDW	Largest unit out of service	2040	TM2
WASSTRIP	Capacity (HRT = 24 hours)	MMDW	All units in service	2040	TM2
Secondary Expansion 2	Capacity	MMDW	All units in service	2041	TM2, TM4
Tertiary Filters Phase 2	Capacity (SLR = 0.45 ppd/sf)	MMDW	All units in service	2045	TM2, TM5

Notes:
lb/hr/unit - pounds per hour per unit.

A summary timeline of triggered projects is shown graphically in Figure 16.3. For some projects, a range of trigger years is shown. This is due to observed flow and loads increasing at a slower rate than originally projected, allowing for flexibility in the timing of the project.

[9] Jacobs (2022-02-08). Flow and Load Projections. Memorandum. West Basin Master Planning Preliminary Work.

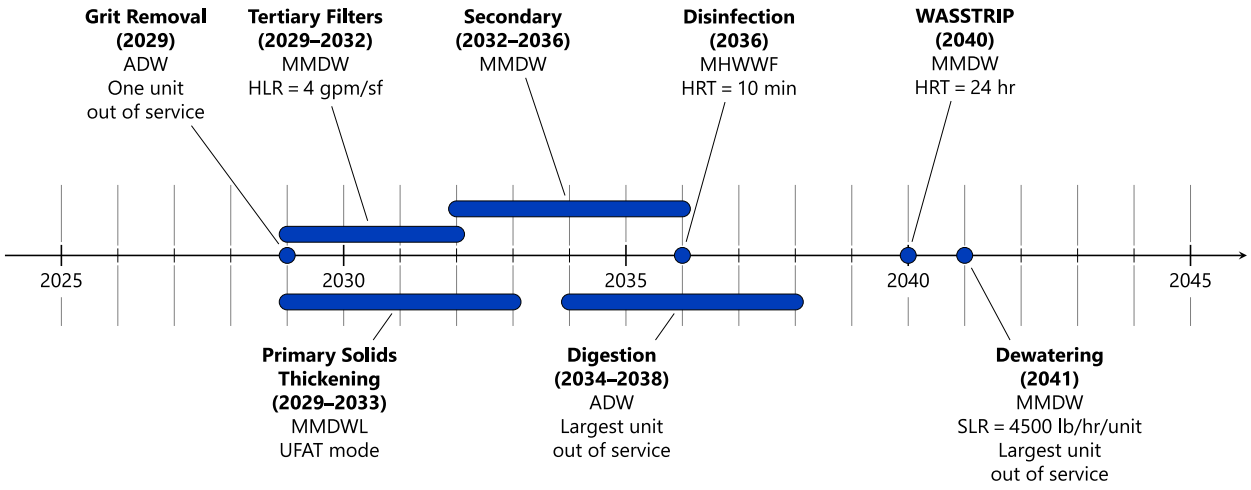

Figure 16.3 Triggered Project Timeline

Project design and construction durations were standardized based on estimated construction costs, as summarized in Table 16.5. These durations were used to develop the CIP timeline in Figure 16.4, which illustrates the distribution of CIP projects at the Rock Creek WRRF over the planning period.

Table 16.5 Project Duration Assumptions

Construction Cost	Design Duration, months	Construction Duration, months	Total Duration, months
< $10M	14	20	34
$10M to $30M	18	24	42
$30M to $50M	20	30	50
> $50M	24	36	60

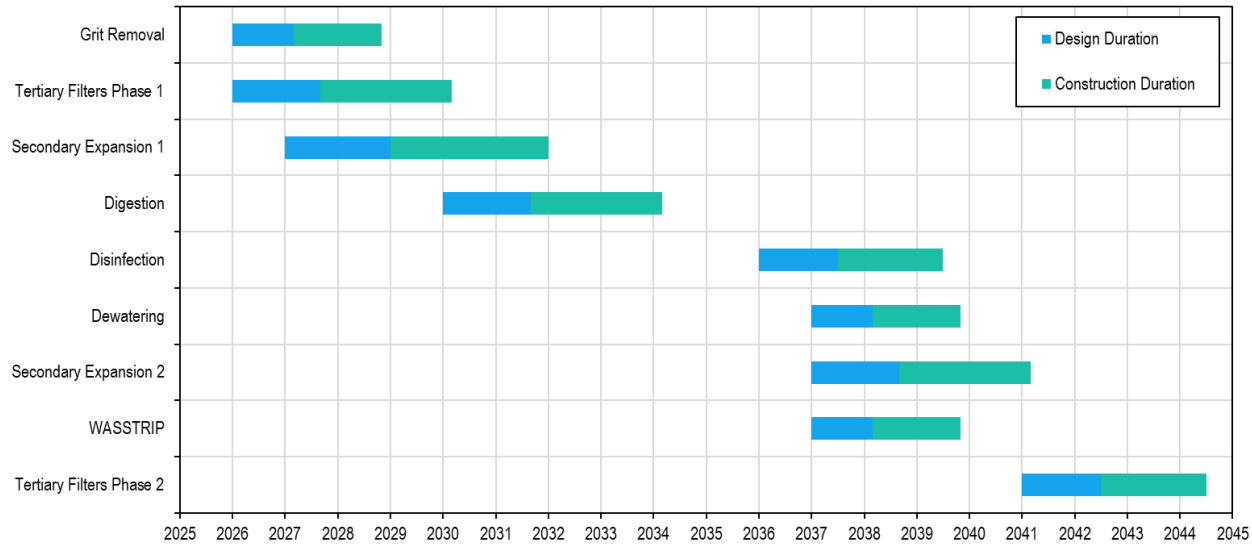

Figure 16.4 Rock Creek WRRF CIP Timeline

16.6 2045 Capital Improvements Plan

The estimated cash flow for the recommended improvements over the 20-year planning horizon is presented graphically in Figure 16.5 and summarized in Table 16.6. CIP costs shown in Figure 16.5 and Table 16.6 are escalated to the anticipated midpoint of construction based on the CIP timeline shown in Figure 16.4.

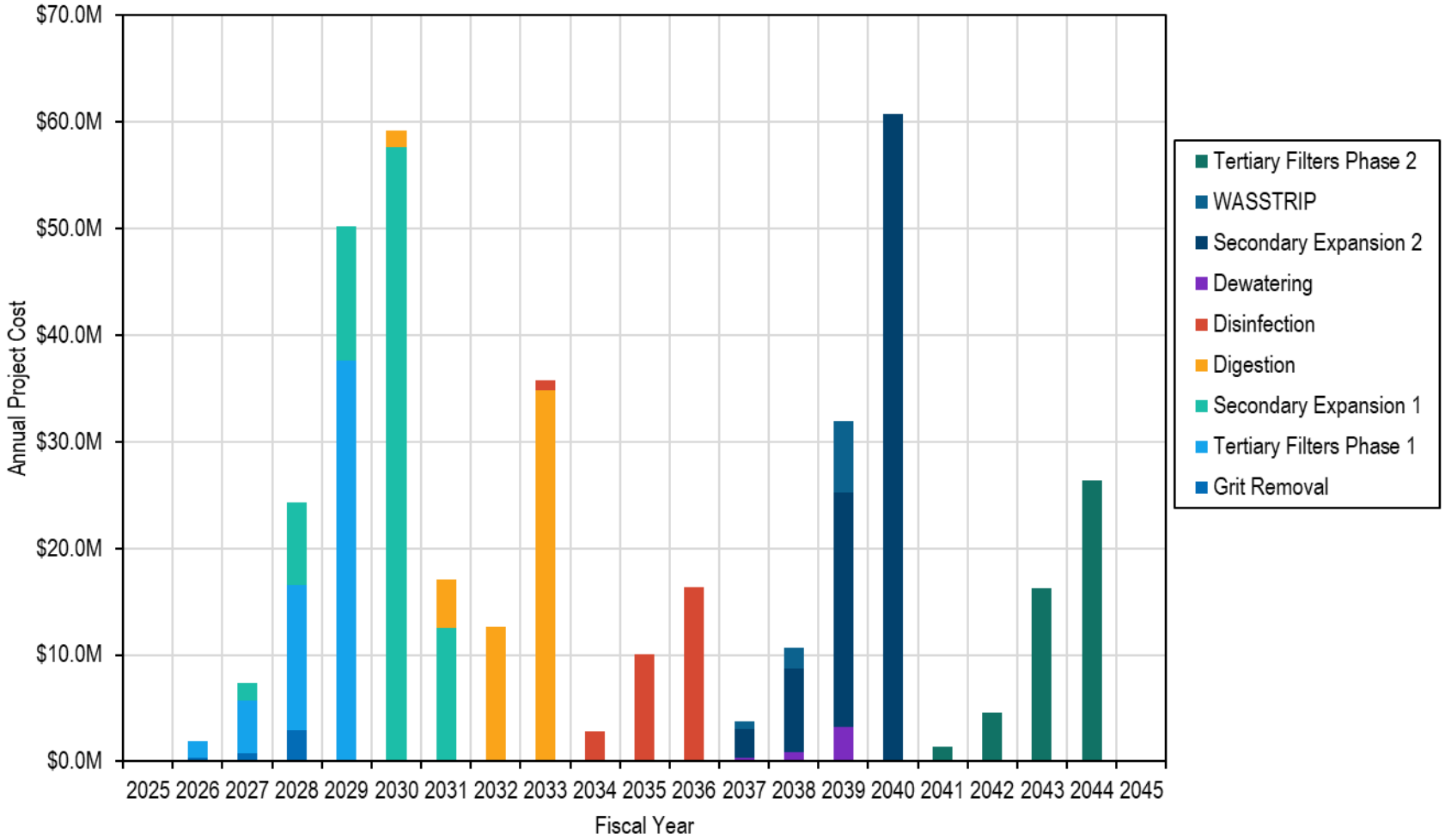

Figure 16.5 Rock Creek WRRF CIP Cash Flow

Table 16.6 Rock Creek WRRF Cash Flow(1)

Fiscal Year	Grit Removal	Tertiary Filters Phase 1	Secondary Expansion 1	Digestion	Disinfection	Dewatering	Secondary Expansion 2	WASSTRIP	Tertiary Filters Phase 2	Total(2)
2025										**$0**
2026	$300,000	$1,600,000								**$2,000,000**
2027	$800,000	$4,900,000	$1,700,000							**$7,400,000**
2028	$2,900,000	$13,600,000	$7,700,000							**$24,300,000**
2029		$37,600,000	$12,500,000							**$50,200,000**
2030			$57,700,000	$1,500,000						**$59,200,000**
2031			$12,500,000	$4,500,000						**$17,000,000**
2032				$12,600,000						**$12,600,000**
2033				$34,900,000	$900,000					**$34,900,000**
2034					$2,800,000					**$2,800,000**
2035					$10,100,000					**$10,100,000**
2036					$16,300,000					**$16,300,000**
2037						$300,000	$2,600,000	$700,000		**$3,700,000**
2038						$900,000	$7,900,000	$1,900,000		**$10,600,000**
2039						$3,200,000	$21,900,000	$6,800,000		**$31,900,000**
2040							$60,800,000			**$60,800,000**
2041									$1,400,000	**$1,400,000**
2042									$4,600,000	**$4,600,000**
2043									$16,300,000	**$16,300,000**
2044									$26,400,000	**$26,400,000**
2045										**$0**
Total	**$4,000,000**	**$57,800,000**	**$92,000,000**	**$53,500,000**	**$30,100,000**	**$4,400,000**	**$93,500,000**	**$9,600,000**	**$48,700,000**	**$393,300,000**

Notes:
(1) Costs have been escalated to the mid-point of construction.
(2) Summation differences for totals are due to rounding.

16.7 Site Plan

A combined site plan is presented in Figure 16.6, showing the locations of recommended improvements through the planning period and buildout. Although not identified as part of this planning effort, space has been shown on the site for a renewable natural gas facility, fats, oils, and grease (FOG) receiving station, and an expanded reuse pump station, as these are projects the District has already begun or intends to undertake within the planning period.

Although the addition of a sludge dryer was not identified as part of the recommended solids management plan within the planning period, space has been reserved for a future sludge drying building on the south end of the existing Dewatering Building. Reserving this space maintains flexibility to integrate drying into the process should the District wish to reduce hauling costs, generate a Class A product and/or implement a drying process as a supporting treatment step for PFAS removal.

There is a wetland area associated with an unnamed tributary to Rock Creek WRRF to the east of the existing site. The boundary of this wetland in the southeast corner of the site, as identified in a 2003 Natural Resources Assessment Report[10], has been shown on the site plan for reference. The location of the new GMFs associated with Tertiary Expansions 1 and 2, relative to the wetland boundary, will result in additional permitting requirements and may impact the projected scope and schedule of these projects. Further investigation will be required to determine whether Secondary Clarifier 13, planned as part of the Secondary Expansion Phase 3 buildout project, and CCB 4 would encroach on the wetland or the vegetated corridor that buffers it.

[10] CH2MHill (October 2003). Natural Resources Assessment Report, Rock Creek WRRF Phase 6 Expansion Project.

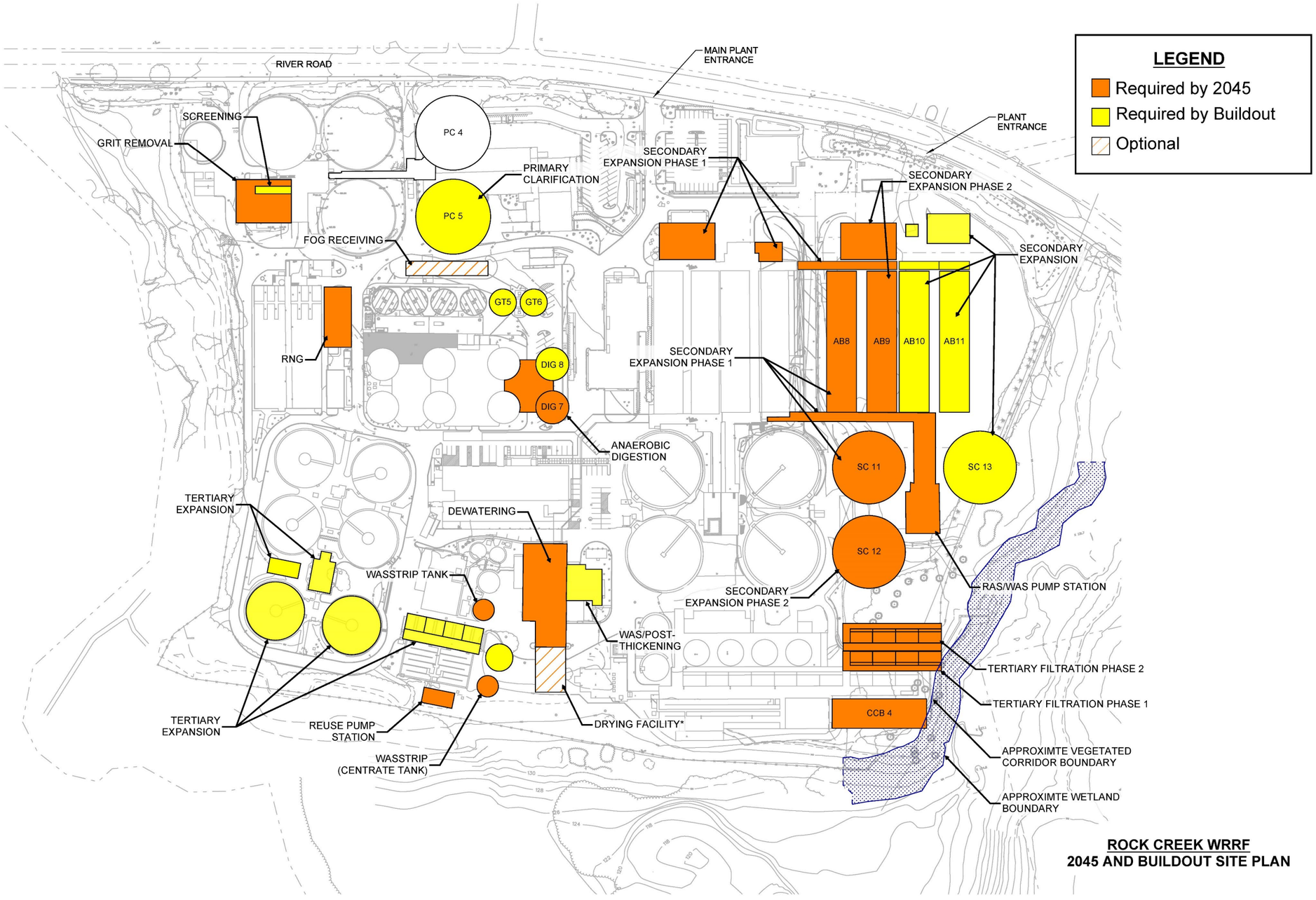

Figure 16.6 Rock Creek WRRF 2045 and Buildout Site Plan