SEQUANA
WATER ENVIRONMENT ENERGY

SDP ASSET REPLACEMENT MODEL AND DELIVERABILITY REVIEW – 2027-32

ISSUED

Prepared for: Sydney Desalination Plant (SDP)

Date: 11 September 2026



ACKNOWLEDGEMENT

Sequana acknowledges the Traditional Owners of Country throughout Australia and pays respect to and recognises the contribution from their Elders past and present.

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EXECUTIVE SUMMARY

SDP is preparing its pricing submission for the 2027–32 period. As SDP's regulatory advisor, Sequana reviewed the Asset Replacement Model that governs the capital program behind that submission, together with the supporting asset strategies, benchmarked against comparable desalination and major water-treatment plants.

This review found:

- **Total delivered cost.** Assets are valued on their full delivered cost, not procurement alone. Each value starts from a benchmarked equipment cost and adds labour and installation, project management, operator's margin and owner's costs, so the forecast reflects total costs for renewing an asset on a live, access-constrained plant.
- **A disciplined capital boundary.** The line between capital renewal and operator maintenance is clearly set and consistently applied. SDP tested an asset register of approximately 27,400 lines against a fixed set of rules and recorded a decision and a reason for each.
- **Values and lives consistent with benchmark.** Replacement values sit within the ranges expected for comparable desalination and major water-treatment plants, and where direct benchmarks were not available, they were tested against current cost curves by size and material. Asset lives are set by asset class and tied to the original design specifications.
- **Asset life matched to operating duty.** Life is adjusted for how hard the Plant is run and applied selectively rather than across the board. Duty-driven assets such as rotating equipment shorten as utilisation rises, while passive static assets such as concrete structures, pipework and the seawater tunnels are excluded, because corrosion and age rather than throughput govern their replacement.
- **Maintenance modelled.** Maintenance is carried as explicit frequency-and-cost streams rather than a flat percentage of asset value, with intervals drawn from OEM servicing schedules and the Plant's own maintenance history. Each assumption is therefore visible and testable.
- **A risk-based approach to membrane replacement.** Membrane replacement can be one of the largest renewal programs, SDP has taken a risk-based approach, informed through customer engagement, and renegotiated the supply warranty rather than replacing elements that had not reached the end of their life pushing out renewal costs.
- **An energy recovery asset group with a robust, incremental retrofit strategy.** The thirteen first-pass energy recovery devices are valued on conversion to rotary pressure exchangers, with the retrofit sequenced across 2030 to 2035 and a one-off refurbishment of a portion of the existing DWEER units in the interim to keep them in service until their train is retrofitted.

Based on the forecast capital investment, the program increases sharply from 2030, peaks near $39 million in 2037, and stays elevated for close to four regulatory periods. A deliverability assessment has been undertaken to confirm the resources required to build and prepare for it.

Every element of the methodology and each major asset group was rated green, amber or red against two tests (consistency of the modelled basis with SDP's asset strategies and obligations, and alignment of the resulting value with observed benchmarks). SDP has produced a comprehensive and benchmarked capital program; this review concluded that the methodology is sound, the assumptions underpinning it are reasonable and supported by evidence, and the forecast is suitable as a basis for SDP's long-term capital planning.

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1 BACKGROUND

Sequana has been engaged to review the Sydney Desalination Plant (SDP) Capital Works Model, the asset replacement and Schedule 9 renewals forecast underpinning SDP's 2027–32 pricing submission to IPART. Sequana previously supported SDP in reviewing aspects of its asset management practices, asset valuation approach and long-term renewals planning. This review independently tests the model's outputs, replacement values, service lives, overhaul allowances, the utilisation-based life-adjustment approach, and deliverability, against external benchmarks and good asset management practice.

The model issued to Sequana comprises 3,046 Schedule 9 asset lines with an aggregate replacement value of $807.2 million at the model's cost bases, or $839.6 million when escalated to $FY27 by CPI. Of these, 2,738 lines carry a replacement value and 308 are nil-value placeholders. Sequana has been engaged by SDP to address three questions:

- whether the methodology and outputs are sound and consistent with asset-management and valuation practice for comparable desalination assets;
- whether the asset life, spread, and overhaul / service approaches (including the utilisation-based life-adjustment) are appropriate; and
- whether the resulting renewals program is deliverable.

This review was undertaken on the SDP Capital Works Model (*260710 SDP Capital Works Model)*, issued to Sequana on 15 July 2026, together with the supporting asset strategies and the Schedule 9 determination listed at Appendix A. All figures reported here are drawn from that version, generated on the case 3 utilisation setting (approximately 50 per cent operational capacity). SDP has continued to develop the model since it was issued for review, and SDP has advised Sequana of minor refinements. One example is an update to the escalation factor carried in the model for movement in the Consumer Price Index (CPI). These have not been incorporated into the figures presented in this report. The review has deliberately been left as an independent, point-in-time assessment of the version examined, so that the findings can be read against a fixed and identifiable model. The matters raised in Section 8 are directed at the methodology and its supporting evidence rather than at particular output values, and none of the subsequent refinements notified to Sequana alters the conclusions in Section 7.

Sequana has previously supported SDP in asset valuation approach and long-term renewals planning. That work is described here so the basis of this review is transparent. Sequana did not build the Capital Works Model, populate its asset register, or prepare the Schedule 9 determination; each of these was produced by SDP (drawing on input from its Operator where required). This review has tested those outputs against external reference points including benchmarked replacement costs, lives and maintenance frequencies from comparable desalination and major water-treatment plants, current cost curves by size and material, and standard lifecycle assumptions for major water assets. Where the review has not been able to test an input independently, this is stated in the relevant section.

This report is structured as follows: the review approach (Section 2); the assessment of the model's methodology and assumptions, covering the capital boundary, replacement values, asset life, spread, overhaul and maintenance, and escalation (Section 3); the category level assessment of the asset groups (Section 4); the deliverability of the resulting capital program (Section 5); observations of good practice (Section 6); and the conclusion and recommendations (Section 7 and Section 8).

1.1 REGULATORY AND OPERATING CONTEXT

SDP is a price regulated bulk water supplier preparing its pricing submission to IPART for the 2027–32 period. Under IPART's 3Cs framework (Customers, Costs and Credibility) SDP must demonstrate that proposed expenditure is prudent and efficient and is supported by credible evidence, with particular emphasis on transparency, traceability and the justification of forecasts.

SDP's operating context has also changed materially. Since 1 July 2023 the Plant has operated on a flexible full-time basis, with production requests issued by Sydney Water under the Water Supply Agreement. This influences capital planning: changing outage flexibility, access windows and the rate at which asset life is consumed, and it potentially impacts the practical deliverability of a renewals program. An asset base previously renewed around long idle periods must now be renewed around near continuous production.

Three systems provide input to the forecast:

- **VAMS**, the Operator's asset management system, holding the engineering asset register of approximately 27,400 line items, with asset replacement values, tags, hierarchy and condition data.
- **Sinapse**, lifecycle cost modelling software that utilises VAMS data to generate long-term capital forecasts on a risk-based framework.
- **The Fixed Asset Register (FAR)**, SDP's financial reporting structure of approximately 1,000 line items, on which capital expenditure is ultimately recognised and reported.

These systems provide the inputs to a consolidated capital renewals program.

1.2 WHY THE MODEL WAS REBASED

The values in the legacy forecasts were built largely on procurement-only (equipment) costs. Equipment cost alone does not capture the full cost of delivering a renewal project on a live, access-constrained site: planning, project management, installation, commissioning and owner's costs. Rebasing the values to a total delivered cost basis provides more realistic and transparent costs to maintain and renew the Plant. The Capital Works Model under review is the result of that rebasing.

2 REVIEW APPROACH

This review builds on an established understanding of SDP's asset base, asset management principles, valuations and renewals planning. The model was tested against three reference points:

- **Benchmarking**, replacement costs, lives and maintenance frequencies from comparable desalination and major water-treatment plants.
- **Comparative analysis,** current asset pricing and cost curves by size and material, used to interpolate where direct benchmarks were unavailable.
- **Standard lifecycle assumptions** for major water assets.

The review covered the model's methodology (cost composition, life, spread, maintenance and escalation), the capital boundary, the asset specific strategies, and deliverability. The aim of the review is to test how the model has been built and confirm it reasonably estimates the capital expenditure required for the ongoing operation of the Plant in compliance with its obligations and what would be typical forecast capital investment for a large-scale

desalination plant of its age and utilisation. The consolidated assessment and category level reviews are in Section 4.

3 REVIEW AND ASSESSMENT

This section sets out how the model is understood to have been built and how it compares with the benchmarks above.

3.1 THE CAPITAL BOUNDARY, SCHEDULE 9

Schedule 9 to the Operations and Maintenance Deed defines the boundary between capital renewal, funded by SDP, and operator maintenance, funded within the Operator's repairs and maintenance allowance. It forms the basis of the assets which are included in the forecast: if an asset replacement or major maintenance task is not identified in Schedule 9 it is funded as maintenance, and if it is listed in Schedule 9 it is funded as capital.

SDP provided the Schedule 9 determination for Sequana's review. During 2025–26 the Operator proposed placing the full asset register, around 27,400 lines, before SDP for a funding determination, together with a revised preventive-maintenance task list. SDP reviewed the proposal line by line against a consistent set of rules: full replacement only (partial replacement remains maintenance), major works reserved for civil and site assets, a materiality threshold, parent–child consistency, a maintenance-frequency threshold, and double-count testing against the renewals program. Every line carries a recorded decision and reason.

The determination and the rules behind it were reviewed. Of the lines not previously in Schedule 9, under two per cent were brought into the capital forecast. The inclusions appear reasonable and consistent with the stated rules (that is, full replacements of civil and site assets rather than maintenance) each carrying a recorded decision and reason, with a full audit trail.

3.2 ASSET REPLACEMENT VALUES

Every asset is valued on a total delivered cost basis, consistent with accepted asset-management and valuation practice for comparable desalination and major water-treatment assets (Table 1). Each replacement value starts from a benchmarked procurement cost and is built up with labour and installation, project management and owner's costs, and margin, so that it reflects the full cost SDP incurs to renew the asset on an operating site. Category-specific split factors are applied consistently: a higher labour and installation share for buildings, civil and site-assembled assets, and a higher procurement share for equipment-dominated assets such as electrical and controls equipment.

TABLE 1 TYPICAL PROCUREMENT, LABOUR, OWNER'S AND MARGIN SPLIT FACTORS

Cost component	Typical share	Basis
Procurement	Base	Benchmarked equipment / supply cost by class and size, OEM and supplier pricing, comparable projects, and cost curves by diameter and material.
Labour & installation	5–60%	Set by class; highest for buildings, civil and site assembled assets, lowest for equipment dominated items.
Project management & owner's costs	5–15%	Planning, project management, commissioning and owner's costs on a live, access-constrained site.

Cost component	Typical share	Basis
Margin	5–10%	Delivery margin and overhead, consistent with SDP's project experience.

The build-up has been sanity checked against SDP's own delivery. For example, a DN1200 butterfly valve (VLV52101-30) that SDP recently renewed, the model's procurement estimate falls within 0.7% of the actual cost. This is a single example, and individual items will vary above or below, but it indicates the cost basis is aligned to current market pricing. Taken with the benchmarking above, it confirms the adopted values are realistic and consistent with current market rates.

Validation, DN1200 butterfly valve (VLV52101-30)

Model procurement estimate (assuming 20% labour costs and 5% PM and 10% margin): $84,149 **Actual SDP procurement cost:** $84,755 **Variance:** **–0.7%**

A benchmarked, diameter based estimate falling within one per cent of an actual purchase is strong evidence that the cost basis is anchored to the market.

3.3 ASSET LIFE

Each asset carries a Life Expectancy (its nominal design life), from which the model also derives a utilisation-adjusted Service Life. In the issued base case, replacement timing runs mainly off Life Expectancy, which sets the replacement year for around 89% of assets. Asset lives cluster in a few bands (25 years for around 70% of lines, and 50 or 100 years for most of the civil and structural assets) with RO membranes on a fixed 10-year cycle. Within a group the lives are not always uniform. Table 2 sets out the adopted life, spread and periodic-maintenance treatment by asset group.

TABLE 2 ADOPTED REPLACEMENT LIFE, SPREAD AND PERIODIC MAINTENANCE BY ASSET GROUP (FROM SDP CAPITAL WORKS MODEL)

Asset group	ARV ($FY27)	Life expectancy – years (number of assets)	Spread – years (number of assets)	Periodic maintenance – assets covered; interval in years
Pipework	$272.2M	25 (803); 100 (24); 50 (21); 15 (2); 35 (1)	5 (599); 10 (212); 0 (23); 4 (9); 6 (6); 8 (2)	None
Tunnels	$155.9M	50 (6)	5 (4); 10 (2)	None
Tanks	$48.0M	50 (43); 25 (37); 100 (24); 30 (2)	10 (44); 6 (39); 8 (19); 3 (3); 1 (1)	64 of 106; 5–30 yr
Gravity Media Filters	$47.4M	50 (24)	10 (24)	24 of 24; 15 yr
Membrane Housing	$45.4M	25 (20)	6 (20)	20 of 20; 15 yr
Centrifugal Pumps	$44.5M	25 (271)	6 (193); 2 (32); 5 (25); 3 (11); 4 (8); 1 (4)	86 of 273; 4–6 yr
Energy Recovery Devices	$44.2M [(a)]	25 (66)	1 (66)	DWEER refurbishment: 45 of 66 assets; 100 yr [(b)]

Asset group	ARV ($FY27)	Life expectancy – years (number of assets)	Spread – years (number of assets)	Periodic maintenance – assets covered; interval in years
Buildings & Structures	$43.0M	50 (60); 100 (1); 60 (1); 25 (1)	10 (62); 8 (1)	63 of 63; 5–25 yr
Power Distribution	$36.4M	25 (211); 10 (12); 45 (1)	6 (113); 4 (64); 2 (39); 1 (9); 3 (9); 5 (2)	88 of 236; 4–10 yr
RO Membranes	$29.2M	10 (20)	1 (20)	None
Major Valves	$26.7M	25 (350); 100 (11); 50 (1)	8 (208); 6 (87); 0 (45); 5 (20); 2 (5)	None
Concrete Structures	$7.3M	50 (78); 100 (64); 25 (2); 54 (1)	10 (138); 0 (5); 2 (2); 1 (2)	37 of 147; 15 yr
Control System	$7.2M	30 (14); 15 (10)	2 (24)	None
Variable Speed Drives	$6.1M	25 (79); 15 (9)	2 (76); 1 (13)	67 of 89; 10–11 yr
Pressure Vessels	$3.0M	50 (108); 25 (28)	0 (130); 4 (6)	None
Fire & Life Safety	$3.0M	25 (58)	2 (39); 4 (12); 1 (7)	48 of 58; 5–30 yr
Cartridge Filters	$2.6M	25 (28)	5 (28)	None
Other categories (incl. screens, penstocks, mixers, centrifuges, cathodic protection, cranes, analysers, flow meters, and 17 more)	$17.6M	25 (190); 15 (18); 10 (13); 100 (9); 50 (1)	4 (66); 2 (51); 1 (40); 0 (34); 5 (19); 6 (18); 3 (7); 15 (1); 10 (1)	39 of 237; 3–10 yr
Total — all groups	**$839.6M**			
(a) The 45 assets carrying the one-off refurbishment hold $30.3M of replacement value.				
(b) The 100-year interval is a modelling technicality, not a design life. The refurbishment is a one-off task carried out before retrofit; refer to Section 4.3 for more details.				

The table shows each asset's Life Expectancy, which is what drives the replacement dates. Separately, the model computes a utilisation-adjusted Service Life, which shortens as operating duty increases for duty-driven assets such as rotating equipment, as described in the next section (Section 3.3.1).

3.3.1 UTILISATION-BASED LIFE ADJUSTMENT

The model includes adjustments of asset life to operating duty through a selectable utilisation input (minimum continuous operational turn down through to full capacity of 100%). This flexibility is a strength of the model; it enables SDP to align the renewals forecast to whatever production profile applies and re-run it as operations evolve. The figures in this review are all generated on case 3 (six of the Plant's twelve trains, around 50% utilisation), which is considered a prudent central basis. Although the Plant is currently producing below this level, current production is not a sound basis for a long-term renewals forecast: the Plant operates on a flexible full-time basis and is contracted to be available to meet Sydney Water's production, peak and emergency requests, and Sydney's underlying demand is expected to grow over the pricing period and beyond. Asset renewals are long-

lived decisions (asset life of 25 to 100 years) and should reflect the utilisation the assets will experience across their lives, not a single low-production year. Anchoring the forecast to today's low production would extend modelled lives further and understate the renewals the Plant will require as utilisation rises toward its operating role; case 3 instead sits above SDP's adopted five-year demand forecast (~37.6 GL/year), providing a reasonable prudent margin without over-provisioning a full twelve-train (100%) assumption would imply. At this setting a 25-year asset is modelled at 27 years and a 50-year asset at 55, and full twelve-train operation remains available in the model and can be selected if and when higher utilisation is required, at which point the adjustment shortens asset lives accordingly. The adjustment is applied selectively through a per-asset flag, and asset classes whose deterioration is not duty-driven (buildings, tunnels, energy recovery devices and power distribution) have been excluded from this adjustment, consistent with the treatment of passive assets such as pipework, where corrosion and age rather than utilisation govern replacement. This is in line with good practice.

3.3.2 SPREAD

Replacement events are spread over class specific periods, from one year for discrete equipment such as the energy recovery devices and membranes, to ten years for civil and plant wide renewals (Table 2). This produces a realistic annual profile and builds in the time needed for outage and access planning, which is the binding constraint on delivery at SDP. Noting the energy recovery devices is worth reconciling if there is a staged upgrade replacement (Section 4.3).

3.3.3 OVERHAUL AND MAINTENANCE

Maintenance is carried as explicit cost streams rather than a percentage of replacement value. Around 580 assets carry a periodic-maintenance cost that recurs on a set cycle (every four to thirty years), mainly membrane housing, filters, buildings, pumps, tanks, power and concrete. Each activity flows into the forecast in the year it falls due which makes the treatment transparent and defensible.

3.3.4 ESCALATION

Replacement values are escalated to $FY27 by CPI (a factor of 1.0399 from a 2025 base, with 2027 as the reference year). This was verified on sampled assets; the basis and reference year should be stated in the submission.

3.4 SUMMARY OF APPROACH AND ASSESSMENT

Drawing the elements together, the assessment of the model's approach and outputs is set out below. Each element carries a confidence rating, and the same ratings are applied to the asset categories in Section 4.6.

The rating reflects two aspects tested in this review: whether the modelled basis is consistent with SDP's asset strategies and its obligations for the Plant, and whether the resulting value sits in line with observed benchmarks.

- Green: the method follows SDP's strategy and the value sits within the expected range.
- Amber: the basis was tested, and the value is reasonable for this submission. The element would be sharpened by further asset work, such as an updated valuation, a condition assessment, alignment with a strategy still being delivered, or breaking a consolidated line into its principal components, as noted against the relevant categories.
- Red: the basis was not sound, and the model would need to change before the number could be relied on. No element has been categorised as Red.

TABLE 3 SUMMARY ASSESSMENT, METHODOLOGY AND APPROACH

Element	Assessment	Rating
Capital boundary, Schedule 9	Robust, prudent and transparent, with a full line-by-line trail; under two per cent of proposed lines brought into capital. Confirm the model reflects the final agreed population.	Green
Replacement-value methodology	Total delivered cost basis, the ARVs consider procurement, labour, owner's costs and margin.	Green
Asset life	Design lives consolidated by asset grouping and asset class and tied to the 2009 original build design specifications. The two 50-year seawater tunnels and the pipework asset life warrant confirmation against benchmarks (as detailed in Section 4.3).	Amber
Spread	Class specific spreads that give a realistic profile and build in outage time.	Green
Overhaul and maintenance	Explicit frequency and cost streams rather than a flat percentage, transparent and defensible. Populate or remove the empty inspection stream.	Green
Escalation	CPI escalation to $FY27 applied; state the basis in the submission.	Green
Utilisation based life adjustment	A sound, selectively applied initiative with higher account to active assets (rather than passively utilised assets).	Green

4 ASSESSMENT OF ASSETS – CATEGORY REVIEW

This section details the review of the asset base category by category, from the largest value drivers to the asset specific strategies and sets out how the adopted values sit against benchmarks and each group's composition. Replacement value is concentrated in a small group; the eleven largest groups carry around 94% of value, and pipework and the seawater tunnels just over half.

4.1 PIPEWORK AND TUNNELS

Pipework is the largest category at $272.2 million (803 out of 851 lines with 25-year life), valued on cost-per-metre curves by diameter and material and benchmarked against comparable pipelines. The values are well supported; consolidating them into a small number of "All Pipework" lines is the main opportunity to add further granularity and transparency.

The two seawater tunnels ($76.0 million each, 50-year life) are the highest-value single assets and fall due in 2058–59, well beyond the pricing horizon.

4.2 RO MEMBRANES AND MEMBRANE HOUSING

SDP has adopted a new RO membrane replacement strategy. The current RO membrane elements were last replaced in 2019 and, with the Plant operating intermittently (around 35% production) since, no performance-driven replacement has yet been required. A complete replacement of the RO membranes is a considerable investment, in the order of $50 million including procurement, shipping, installation, disposal of the old elements and the Operator's fee. The timing and staging of replacement is one of the larger single decisions in the program. The move to flexible full-time operation will consume membranes faster, and a complete replacement is not

feasible because the outage would prevent SDP meeting its Sydney Water obligations; progressive, staged replacement is therefore a requirement.

SDP's strategy is built on measured condition rather than elapsed time. SDP carried out an investigation of the potential drivers for membrane replacement, testing each recognised driver against operating data. Feed pressure, differential pressure, salt passage, boron rejection, bromide passage, membrane autopsy results and the net cost of water were each examined separately. Of these, salt passage was found to be the only active replacement driver. An explicit acceptable-risk position was set (high/low book-ends with an adopted value between), a 25-year discounted lifecycle model was built on contractually guaranteed element pricing (fixed for 25 years, escalated by the US PPI), and seven options were tested. Train-by-train replacement proved materially cheaper than element-by-element, and replacing on measured performance cheaper again than holding to the design average life. The adoption of this strategy in the RO replacement program is scheduled to begin in FY28/29 and works through the trains over four years, with a second wave from FY36/37, holding the availability impact to about two per cent and maintaining an average membrane life of around ten to eleven years.

This approach is notable for a couple of reasons. The customer position was set first: Sydney Water's bulk-water volumes under the IPART determination (44 GL/y in 2026/27, then 36 GL/y to 2031) give a five-year average of 37.6 GL/y, and the deferral rests on that basis rather than assumption. Second, the warranty was renegotiated rather than serviced: the 96-month performance warranty (renegotiated in 2019 to a four- and six-year warranted life) expired in June 2026, and maintaining it would have required replacing roughly 43% of first-pass and 14% of second-pass elements by that date, expenditure to preserve a warranty rather than performance, given the membranes had not reached end of life.

In the model, the membrane elements sit in an RO Membranes group ($29.2 million, 20 lines) on a 10-year replacement cycle, due 2035–41, with the racks in a separate Membrane Housing group ($45.4 million, 25-year life, periodic maintenance every 15 years, due 2033–35).

4.3 ENERGY RECOVERY DEVICES

SDP has also adopted a new strategy for the first-pass energy recovery devices, developed on the same integrated lifecycle basis as the membranes. Thirteen dual work exchanger devices (DWEER) serve the first-pass trains and are integral to production, energy consumption, water quality and operating cost. Two drivers support renewal, neither of which is financial.

- The first is safety: DWEER is a reciprocating piston device that has significant cyclic forces (i.e., the frame and the adjacent pipework), the risk is currently managed by restricting access, which in turn makes the units harder to operate, inspect and maintain.
- The second is obsolescence: the technology is being retired across the industry, the OEM no longer stocks spare parts, and some lead times now approach a year, so the exposure is concentrated, and several unexpected breakdowns could cut plant capacity for months.

The strategy tested sixteen scenarios across refurbishment, upgrade and retrofit, and their timing, over a 25-year lifecycle model that also carries first-pass membrane replacement and RO-train inlet-valve energy loss so the three are assessed together. Retaining the DWEER units emerged as the highest-cost option and would take the availability impact well beyond the 5% allowance; upgrading leaves it only marginally within the limit and addresses neither the safety nor the obsolescence exposure. The recommendation is therefore to retrofit the units with rotary pressure exchangers before end of life, continuing five-yearly refurbishment of those still in

service, with salvaged components redeployed as spares to mitigate the lead-time exposure. Table 4 sets out the profile the model carries against that strategy.

The following terms apply to Table 4. Each RO train is identified by module, pass and train number; for example, M1 1P T4 refers to Module 1, first pass, train 4. The Plant has two modules (M1 and M2) and thirteen first-pass trains, each with five energy recovery units. DWEER is the existing dual work exchanger energy recovery device; PX is the rotary pressure exchanger that is proposed to replace it. A conversion (retrofit) is the replacement of a train's DWEER units with rotary pressure exchangers; a refurbishment is an overhaul of the existing DWEER units to keep them in service until conversion.

TABLE 4 ENERGY RECOVERY DEVICES, CONVERSION AND REFURBISHMENT PROFILE IN THE MODEL ($FY27)

FINANCIAL YEAR	CONVERSIONS / RETROFITS (TRAINS)[a]	CONVERSION / RETROFIT CAPITAL EXPENDITURE FORECAST ($M)	REFURBISHMENTS (TRAINS)	REFURBISHMENT CAPITAL EXPENDITURE FORECAST ($M)
27/28	–	–	2 (M1 1P T5, M1 1P T6)[b]	[redacted]
28/29	–	–	–	–
29/30	–	–	3 (M1 1P T1, M2 1P T4, M2 1P T5)	[redacted]
30/31	2 (M1 1P T2, M1 1P T4)	[redacted]	3 (M1 1P T3, M1 1P T7, M2 1P T1)	[redacted]
31/32	2 (M2 1P T2, M2 1P T3)	[redacted]	1 (M2 1P T6)	[redacted]
32/33	2 (M1 1P T5, M1 1P T6)	[redacted]	–	–
33/34	3 (M1 1P T1, M2 1P T4, M2 1P T5)	[redacted]	–	–
34/35	3 (M1 1P T3, M1 1P T7, M2 1P T1)	[redacted]	–	–
35/36	1 (M2 1P T6)	[redacted]	–	–
Total	**13 trains**	[redacted]	**9 trains**	[redacted]

(a) Conversions/retrofits recur on each unit's production modified life of 21 to 26 years. [redacted]

(b) Modelled as due 2026, with the allocation spread across 2025 to 2027.

[redacted]

[redacted] The strategy replaces the DWEERs with rotary pressure exchangers one train at a time. Each DWEER is refurbished so it stays in service until its train is retrofitted. The one-off refurbishment shown in Table 4 applies to nine of the thirteen trains. The four trains retrofitted first do not carry it. The 100-year interval recorded against the refurbishment is a modelling device, not a real asset life. It pushes any repeat of the refurbishment cost beyond the modelling horizon, so the cost is counted once, in the near term, and the next two determinations are unaffected. The recurring cycle is included in the retrofit line, on unit lives of 25 years, so future replacements are still forecast. Through the transition period the Plant runs part DWEER and part rotary, so the booster pumps, pipework, controls and other existing assets must handle both. The capital for that interface work sits inside the retrofit estimate, which covers design, fabrication, installation and commissioning for all thirteen trains.

4.4 ROTATING, ELECTRICAL AND CONTROL ASSETS

Pumps ($44.5 million), major valves ($26.7 million), power distribution ($36.4 million) and the control system ($7.2 million) are valued on OEM and supplier pricing with class-appropriate lives and spreads. The values are consistent with benchmarks. There is an opportunity to refine two aspects further: differentiating seawater from potable valve service (lives and rates) within the valve group, and confirming the coverage of "soft" electrical, control and software assets (under 2% of the base) so this small pool is neither under- nor over-represented. These two refinements would provide further granularity but are not expected to have a material valuation impact.

4.5 CIVIL AND STRUCTURAL ASSETS

The civil groups, tanks ($48.0 million), gravity media filters ($47.4 million), buildings ($43.0 million) and concrete structures, are realigned to the Fixed Asset Register and insurance valuations and sit on long (50–100 year) lives. Two refinements stand out: the RO Building is bundled into a single $36.4 million line, 85% of the buildings group and the least granular treatment of any major asset in the model. Breaking that line into its principal systems would put the group on the same footing as the rest of the model; and the largest clean-water storage tanks, which are major concrete structures such as the 40 ML drinking water tank, would sit more naturally with buildings and civil works than in the tanks group.

4.6 SUMMARY ASSESSMENT – GROUP LEVEL

A summary of the assessment per group is outlined in Table 5 below:

TABLE 5 SUMMARY ASSESSMENT, ASSET CATEGORIES

Category	ARV ($FY27)	Assessment	Rating
Pipework	$272.2M	25-year life, 5-year spread. Valued from measured lengths using cost-per-metre curves differentiated by diameter and material class, benchmarked against comparable desalination and water-transfer pipelines. Assets are grouped by area and material class with parent–child relationships mapped through the piping	Green

Category	ARV ($FY27)	Assessment	Rating
		asset numbers and 5-digit asset tag reference, providing a transparent and traceable build-up that still recognises material-specific rates. No periodic maintenance stream is applied; this is noted as recommendation rather than as a limitation on the valuation basis.	
Tunnels	$155.9M	Confirm the 50-year life on the two seawater tunnels ($152M combined), due well beyond the pricing horizon and immaterial to this submission.	Amber
Tanks	$48.0M	Consistent; treat the largest concrete storage tanks on a civil basis. There is an opportunity to treat the large clean-water storage tanks consistently with the buildings-and-civil approach.	Green
Gravity media filters	$47.4M	Consistent with benchmarked filter replacement cost.	Green
Membrane housing	$45.4M	Consistent with benchmarked housing cost.	Green
Pumps	$44.5M	Consistent with OEM pricing.	Green
Energy recovery devices	$44.2M	Priced on the staged transition to rotary pressure exchangers, with existing units refurbished to keep them safely in service until their train is retrofitted, a sound approach. Retrofits run from 2030 to 2035, so the safety and obsolescence exposure is retired progressively and the capital is spread.	Green
Buildings & structures	$43.0M	Realigned to the Fixed Asset Register and insurance valuations. The majority of this group $36.4M (around 85% of the group) sits in a single consolidated "RO Building" line; disaggregating it into its principal systems (structure, roofing, cladding, HVAC, cranes, services) is the most valuable step to improve forecast confidence.	Amber
Power distribution	$36.4M	Consistent; extend coverage of "soft" electrical assets.	Green
RO membranes	$29.2M	RO membranes are replaced on condition, balancing customer risk, warranty and availability.	Green
Major valves	$26.7M	Metallurgy-appropriate; option to differentiate seawater vs potable service.	Green
Other groups (incl. control)	$54.0M	Individually low materiality.	Green

5 DELIVERABILITY OF THE CAPITAL PROGRAM

The forecast capital investment model supports the planning for how the renewal program will need to be delivered. Across 2026–2050 the program averages about $22 million a year, rising to a peak near $39 million in the mid-2030s. The step-change is not immediate. From 2023 through to 2029 the model runs in a narrow band, from about $6 million to about $17 million a year, and the near-term forecast years sit inside it: $10 million in 2026, $11 million in 2027, $12 million in 2028 and $17 million in 2029. On that basis the next four years may be deliverable within the scale of program SDP already runs. The change comes in 2030, when the forecast rises to $29 million, close to double the year before, and the program then stays above the long-run average for most of the 2030s. Sustaining that level for nearly four regulatory periods, rather than absorbing the 2030 increase itself, is the real delivery challenge.

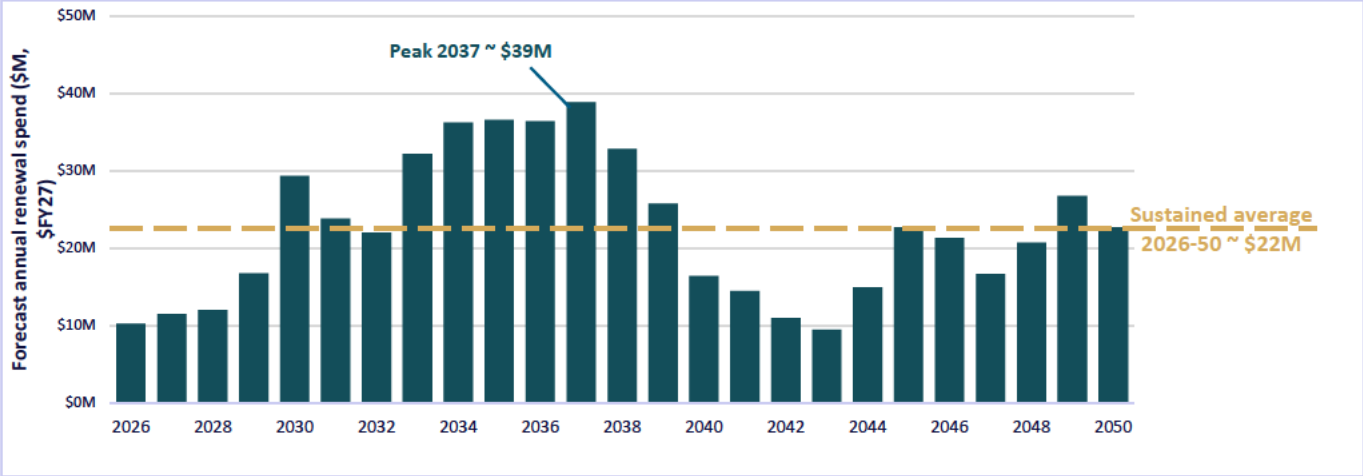


FIGURE 1 ***FORECAST ANNUAL RENEWAL EXPENDITURE 2026–2050, SDP CAPITAL WORKS MODEL ($FY27), AGAINST THE PERIOD AVERAGE OF ABOUT $22 MILLION A YEAR.***

The capital delivery approach will need to consider long-term resourcing to lift delivery capacity. Deliverability of the program is dependent on suitable planning, procurement, construction delivery and commissioning renewals for the next regulatory periods. The concentration of capital investment in the mid-2030s (assets due 2033–2037 carry around $392 million, about 47% of the forecast) reflects the Plant's 2009 commissioning and the predominance of 25-year lives which is typical of a large-scale desalination plant.

5.1 DELIVERABILITY RISKS

Three risks govern delivery:

- **Plant availability.** SDP currently operates at low utilisation (around 20%), which leaves generous windows for renewal work. As utilisation rises with demand and future augmentation, those windows shrink and renewal activity competes directly with production, and available outage duration becomes the governing constraint.
- **Concentration of major common assets.** Much of the expenditure sits in major process assets, centrifugal pumps, pipework, power distribution, pressure vessels, membrane housings and valves, that generally require train shutdowns, common-system isolation or significant electrical switching. These assets, not the smaller items, drive outage planning and program sequencing.

- **Outage intensity.** Left unplanned, renewals concentrate into large shutdown events involving hundreds of contractors and complex, multi-disciplinary commissioning. Staged renewals that maximise online replacement and minimise outage duration are important in managing outages.

5.2 WHAT DELIVERY WILL REQUIRE

Meeting the program depends on several measures being put in place well before the mid-2030s peak:

- **Resourcing.** On an indicative 25% labour / 75% procurement split (as described in detail in Section 5.3), direct trade effort rises from around 25 FTE in 2032 to about 44 FTE by 2037, engineering, installation, commissioning and OEM support, excluding normal operations staff.
- **Procurement and supply chain.** Critical equipment, pumps, membranes, switchgear, transformers, valves, pressure vessels and specialist pipework, carries extended manufacturing lead times. Forward procurement and early OEM engagement will be essential to secure capacity, technical support and staged delivery aligned to planned outages.
- **Planning and technical governance.** The IPART determination is an opportunity to establish a long-term planning framework: integrated engineering planning, configuration management, risk and commissioning planning, and a rolling ten-year outage strategy.
- **Delivery model.** SDP may wish to consider establishing a dedicated Project Management Office during the coming determination period (FY27–32), integrated with plant operations, to support portfolio planning, outage coordination, engineering assurance, procurement and OEM management, program controls, commissioning and lessons learned. More details are outlined in Section 5.3.

5.3 ORGANISATIONAL CAPABILITY AND READINESS

A blended planning assumption of 25% labour and 75% procurement has been adopted for estimating delivery resources required. A 25% uplift comprising 12.5% project management and 12.5% margin and overhead has been applied, consistent with the corresponding assumptions in SDP's Model. Using an indicative all-inclusive trade labour rate of $130/hour demonstrates the order of magnitude of delivery effort required across the forecast period. Indicative labour numbers and expenditure are shown in Figure 2. These are order-of-magnitude estimates and are sensitive to the labour share and the hourly rate adopted for the different suite of tasks to be conducted.

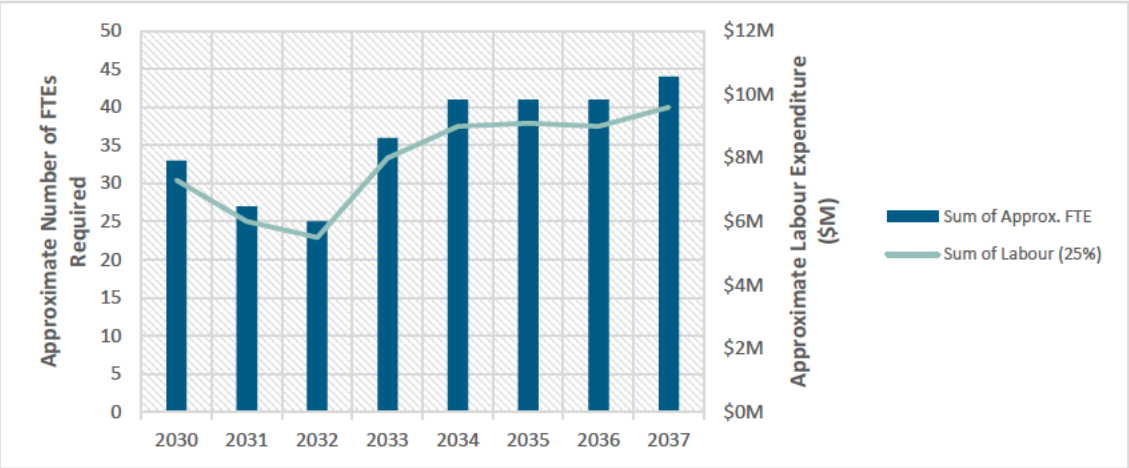


FIGURE 2 FORECAST DELIVERY EFFORT AND EXPENDITURE (ESTIMATE)

The delivery effort increases from approximately 42,000 labour hours (about 25 FTE) in 2032 to more than 74,000 labour hours (around 44 FTE) by 2037. These figures exclude normal operations staff. The work is renewals execution, being direct task-for-task replacement of existing assets rather than redesign or the commissioning of new ones, and the effort is additional to business-as-usual operations and maintenance: the O&M team maintains the Plant, while this resource exists to execute and deliver the renewal tasks. Its cost is carried within the capital forecast rather than on top of it.

As annual overall capital expenditure increases from a current program of around $11 million toward $39 million by 2037, SDP will need to consider additional delivery capacity and coordination arrangements alongside its existing operations and maintenance functions. Based on comparable industrial renewal programs, Table 6 sets out an example of the supporting organisational capability requirements.

TABLE 6 INDICATIVE SUPPORTING ORGANISATIONAL CAPABILITY REQUIREMENTS

Peak Delivery Period	Trade Delivery Effort	Supporting Organisation
2032	~25 FTE	~5–8 FTE
2033	~36 FTE	~7–11 FTE
2034–2036	~41 FTE	~8–14 FTE
2037	~44 FTE	~9–15 FTE

The capital delivery resource pool is expected to comprise approximately 50–60 dedicated personnel, excluding normal plant operations and maintenance staff. Building this capability progressively, rather than at the peak, is what allows the mid-2030s volume to be delivered within available outage windows. Indicative functions of the managing resources are outlined in Table 7.

TABLE 7 INDICATIVE FUNCTIONS THAT MAY SUPPORT DELIVERY OF THE CAPITAL PROGRAM

Function	Primary responsibility
Program Director / PMO	Portfolio governance, prioritisation, reporting and executive oversight
Project Managers	Delivery of renewal programs and outage packages
Project Engineers	Technical coordination, contractor management and commissioning
Planning & Scheduling	Long-term outage planning and integrated schedules
Procurement & Contracts	Strategic sourcing, OEM engagement and contract management
Engineering Assurance	Design reviews, standards and configuration management
Operations Interface	Alignment between operations and capital delivery
Construction Supervision	Field supervision, quality and safety oversight
Commissioning Engineers	Testing, commissioning and operational handover
Quality Assurance	ITPs, hold points, inspections and compliance

Function	Primary responsibility
Finance & Cost Control	Budget management, forecasting and reporting
Commercial Administration	Contract administration, variations and claims
Permitting & Regulatory	Isolations, environmental approvals and statutory compliance
Project & Document Controls	Scheduling, reporting, risk, change and documentation

5.4 OVERALL DELIVERABILITY ASSESSMENT

The forecast represents a significant and sustained increase in delivery activity, but it is achievable with the planning SDP is currently undertaking. The funding outlook and the long planning horizon are a strong foundation, and the near-term years provide sufficient time to build capability before the highest forecast investment periods.

6 OBSERVATIONS OF GOOD PRACTICE

Beyond confirming the robustness of the model, the review identified several features that represent good practice in desalination plant asset management and capital planning. These are summarised below:

✓	**Total delivered-cost basis.** Every asset is valued on its full delivered cost, labour and installation, project management, operator's margin and owner's costs, not procurement alone.
✓	**A considered and risk-based approach to membrane-replacement program.** Membranes are among the Plant's largest lifetime capital items (a full set is in the order of $50 million). SDP set the customer position first, through the Customer Advisory Panel with Sydney Water, then tested condition against it, finding salt passage the only active driver and a life of around ten to eleven years. Rather than service the expired warranty (which implied replacing roughly 43% of first-pass elements by June 2026), SDP renegotiated it, deferring the program to FY28/29, avoiding premature replacement, and preserving a guaranteed 25-year element price.
✓	**A well-defined capital boundary.** The Schedule 9 determination brought under two per cent of proposed lines into capital, each with a recorded decision and reason.
✓	**Parent–child consistency.** Large assets are made up of smaller components (example: a pump, the "parent", has a motor, seals and a baseplate, its "children"). The determination keeps the two aligned; if the parent is treated as day-to-day maintenance, its components are too; if the parent is a capital renewal, its components are funded on that basis. This avoids the common error of a small component being capitalised on its own while the larger asset it belongs to is not (or the reverse), which would distort the forecast. The record shows the rule applied in both directions consistently.
✓	**Explicit maintenance streams.** Maintenance is modelled as discrete frequency-and-cost streams, with intervals drawn from OEM-recommended servicing schedules and the Plant's maintenance history, rather than applied as a flat percentage of replacement value. This links forecast maintenance expenditure to the actual servicing regime of each asset group and makes the underlying assumptions visible and testable.
✓	**A forward-looking utilisation approach.** Asset life is aligned to operating duty, applied selectively rather than uniformly.

7 CONCLUSION

Based on the model version described in Section 1 and the evidence provided to Sequana, is that SDP's approach to forecasting capital expenditure is robust and rests on reasonable assumptions.

Replacement values are built on a total delivered-cost basis and sit in line with comparable plants. Asset lives, spreads and maintenance are set by asset class and drawn from the original design specifications, OEM servicing schedules and the Plant's own operating history. The capital boundary is applied line by line, with a recorded decision and reason for each. On that basis the model reasonably estimates the capital expenditure required to operate the Plant in accordance with its obligations.

Benchmarks and comparative cost curves were used to sense-check individual values rather than as a test of acceptability, and where a value sits outside the expected range, this has been stated with reasons.

A number of improvements have been identified which are covered in Section 8. These recommendations do not alter the conclusion on the forecast for the coming determination period and would strengthen traceability and confidence in later periods.

8 RECOMMENDATIONS

Sequana recommends the following improvements which could be implemented to further improve SDP's long-term capital renewals forecasting:

- **Deliverability uplift planning:** SDP is recommended to consider a detailed deliverability planning review (building on the base provided in this document), and define priorities, resourcing pathways and capability assessment. A staged uplift is recommended, building from initial scoping through to the 2037 peak. Starting early gives SDP time to recruit and develop delivery capability before the higher investment periods.
- **Buildings & structures:** these categories may benefit from more granularity in categorisation (i.e., disaggregate the consolidated RO Building ($36.4M) into its principal systems including structure, roofing, cladding, HVAC, cranes, services). With 85% of the group's value in one line, this is the single most valuable improvement to forecast confidence.
- **Tunnels:** the two seawater intake tunnels (combined replacement value of approximately $152 million) represent long life, low intervention infrastructure whose forecast renewal profile warrants further validation. It is recommended that the current 50-year assumed asset life be confirmed against contemporary industry benchmarks, condition expectations and international tunnel asset management practice. In parallel, consideration could be given to the current placeholder renewal allowance transitioning to a benchmarked valuation methodology that better reflects the long service life, low deterioration rate and practical renewal strategy for these assets.
- **Energy recovery devices: for several years** (especially between 2029–2032) the Plant will operate refurbished DWEER units alongside newly installed pressure exchangers, and the two technologies differ in hydraulic and control behaviour. It is recommended that SDP develop and document a transition strategy covering the operating regime for the mixed plant, the interface and control philosophy, and the condition monitoring and maintenance of the retained DWEERs through to their retrofit date.
- **Static concrete assets:** the large reinforced concrete storage tanks are substantial structural assets with performance characteristics more closely aligned to other long life civil infrastructure than conventional mechanical plant. Treating these assets consistently with the buildings and civil asset group would improve

the uniformity of the forecast methodology by recognising their long design life, relatively low intervention requirements and periodic inspection-based maintenance regime.

Additional to the recommendations above, there is an opportunity to refine a few smaller items noted elsewhere in this document, such as applying a periodic maintenance stream to the pipework group, differentiating seawater and potable valve service (asset lives and ARVs) within the valve group, and reviewing coverage of "soft" electrical, control and software assets (under 2% of the base) so this pool is neither under- nor over-represented. These would add granularity but are not expected to have a material valuation impact.

APPENDIX A — DOCUMENTS RELIED UPON

The documents relied upon in this review are listed in Table 8. All figures reported in this report are drawn from the model version at A.1.

TABLE 8 DOCUMENTS RELIED UPON IN THE REVIEW

REF	DOCUMENT (VERSION / DATE)	ROLE IN THE REVIEW
A.1	*260710 SDP Capital Works Model (issued to Sequana) — model date stamp 25 June 2026; issued to Sequana 15 July 2026*	The version of the SDP Capital Works Model examined. All figures in this report are drawn from this file at utilisation case 3 (50% utilisation).
A.2	*Energy Recovery Device (ERD) Strategy — Rev 02, 17 April 2026*	Asset strategy supporting the DWEER refurbishment and rotary pressure exchanger conversion assumptions.
A.3	*RO Membrane Management Assessment, May 2026 Update — Rev 05, 16 June 2026*	Asset strategy supporting the RO membrane replacement and procurement program.
A.4	*Schedule 9 — Capital Works Schedule, Sydney Desalination Plant Operation and Maintenance Deed — as at 16 December 2025*	The Schedule 9 determination: the asset list and PM list eligible for capital funding, as executed in the Deed.
A.5	*Schedule 9 collaboration pack (Operator and SDP) — 3 February 2026*	The Operator's proposed revisions to the Schedule 9 asset and PM lists, with the criteria proposed for inclusion.
A.6	*Schedule 9 Review Summary — 3 February 2026*	Workbook setting out the current Schedule 9 asset and PM lists alongside the Operator's proposed lists and SDP's responses.
A.7	*Schedule 9 Amendments, meeting minutes — meeting held 3 February 2026, circulated 27 March 2026*	Agreed criteria for capitalisation, the intended use of the two Schedule 9 lists, and the action items arising.
A.8	*Schedule 9 Task List Workshop file — 8 April 2026*	Workbook recording the asset and task list workshop outcomes: items proposed for inclusion, retention, removal and further review.
A.9	*Sydney Water letter to SDP — 6 July 2026*	Sydney Water's formal feedback and recommendations on SDP's Customer and Stakeholder Engagement Program, provided in response to SDP's invitation of 5 May 2026.

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