

TIDEWAY

RECONNECTING LONDON WITH THE RIVER THAMES



Tideway





Tideway Scope

What we are building

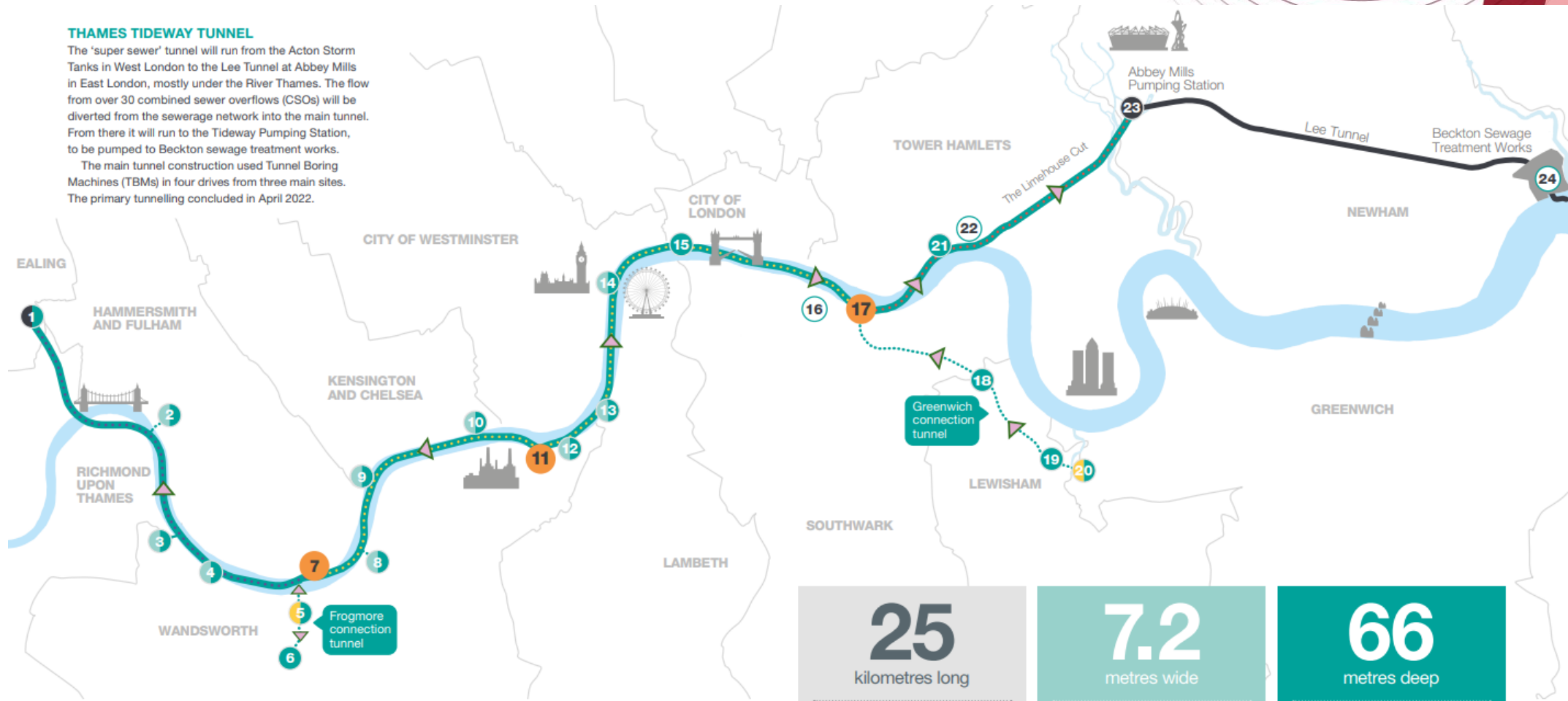


The Project

THAMES TIDEWAY TUNNEL

The 'super sewer' tunnel will run from the Acton Storm Tanks in West London to the Lee Tunnel at Abbey Mills in East London, mostly under the River Thames. The flow from over 30 combined sewer overflows (CSOs) will be diverted from the sewerage network into the main tunnel. From there it will run to the Tideway Pumping Station, to be pumped to Beckton sewage treatment works.

The main tunnel construction used Tunnel Boring Machines (TBMs) in four drives from three main sites. The primary tunnelling concluded in April 2022.



Map key

- Main tunnel drive site
- Main tunnel reception site
- CSO site
- Short connection tunnel drive site
- Long connection tunnel drive site
- System modifications
- Main tunnel
- - - Connection tunnels
- Lee Tunnel
- ◄ Drive direction
- West works site
- Central works sites
- East works site
- 1 Acton Storm Tanks
- 2 Hammersmith Pumping Station
- 3 Barn Elms
- 4 Putney Embankment Foreshore
- 5 Dornay Street
- 6 King George's Park
- 7 Carnwath Road Riverside
- 8 Falconbrook Pumping Station
- 9 Cremorne Wharf Depot
- 10 Chelsea Embankment Foreshore
- 11 Heathwall Pumping Station
- 12 Albert Embankment Foreshore
- 13 Victoria Embankment Foreshore
- 14 Blackfriars Bridge Foreshore
- 15 Shad Thames Pumping Station
- 16 Chambers Wharf
- 17 Earl Pumping Station
- 18 Deptford Church Street
- 19 Greenwich Pumping Station
- 20 King Edward Memorial Park Foreshore
- 21 Bellesbourne Street
- 22 Abbey Mills Pumping Station
- 23 Beckton Sewage Treatment Works

25
kilometres long

Travelling from west to east London, the main tunnel will be 25km long. Two connection tunnels will be 4.6km and 1.1km long.

7.2
metres wide

The main tunnel will have an internal diameter of 6.5 metres between Acton Storm Tanks and Carnwath Road Riverside. It will have a 7.2 metre internal diameter at Abbey Mills Pumping Station. The Greenwich connection tunnel will have a 5 metre internal diameter and Frogmore connection tunnel will be 2.6 metres.

66
metres deep

The tunnel needs to fall one metre every 790 metres so it can be self-cleaning. Starting from 30 metres deep at Acton Storm Tanks, it will finish 66 metres deep at Abbey Mills Pumping Station.



Project Controls
EXPO
London, UK

How Tideway Works



HIGHLIGHTS



HEALTH, SAFETY
& WELLBEING

**NO MAJOR INJURIES
OR SIGNIFICANT
INCIDENTS**
AS A RESULT OF
MARINE ACTIVITIES

128
MENTAL
HEALTH
FIRST
AIDERS



SCHEDULE, COST
& QUALITY

87%
OF
PROGRAMME
COMPLETE

WEST AND
CENTRAL
AREAS
SECONDARY
LINING
COMPLETE

PEAK PRODUCTION
OF SECONDARY LINING
ACHIEVED IN EAST –
**216 METRES
A WEEK**



VISION, LEGACY
& REPUTATION

**INTERNATIONAL
SUSTAINABLE
INFRASTRUCTURE
AWARD 2022**
SUSTAINABLE
CONSULTANCY
AWARDS

COMPLETED ('CLOSED OUT') NINE
OF OUR 54 LEGACY COMMITMENTS,
BRINGING THE TOTAL CLOSED TO 25

TIDEWAY'S COMMUNITY INVESTMENT
PROGRAMME HELPED A TOTAL OF
48,216 PEOPLE & 512 ORGANISATIONS



COMPANY
& PEOPLE

PEOPLE WITH
CONVICTIONS
PROJECT TO
DATE
1 IN 149

APPRENTICES
PROJECT
TO DATE
1 IN 29

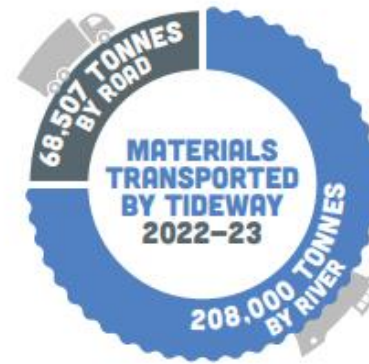
STAFF FAVOURABLE
SURVEY RESULTS:
89% Tideway Values
and promotes diversity
90% I am treated with
respect as an individual



FINANCING

S&P
GLOBAL RATING
ENVIRONMENTAL
BENEFIT SCORE
77/100
'ADVANCED'

ACHIEVED
ALL OUR
FINANCING
PRIORITIES



TO DATE

5,633,000

TONNES MOVED BY RIVER

WHICH MEANS

336,000

FEWER HGVs ON THE ROAD

17.2 million

HGV MILES SAVED – EQUAL TO
36 RETURN TRIPS TO THE MOON

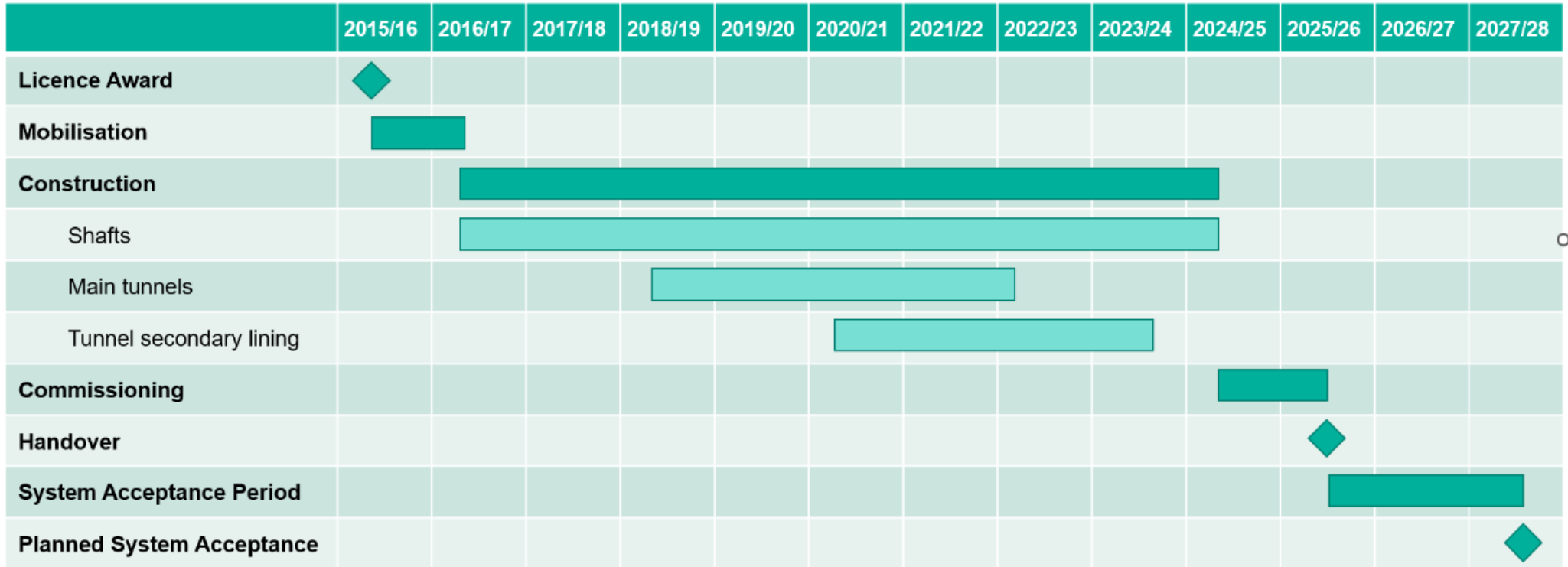
Saving 24,000
tonnes CO2
emissions



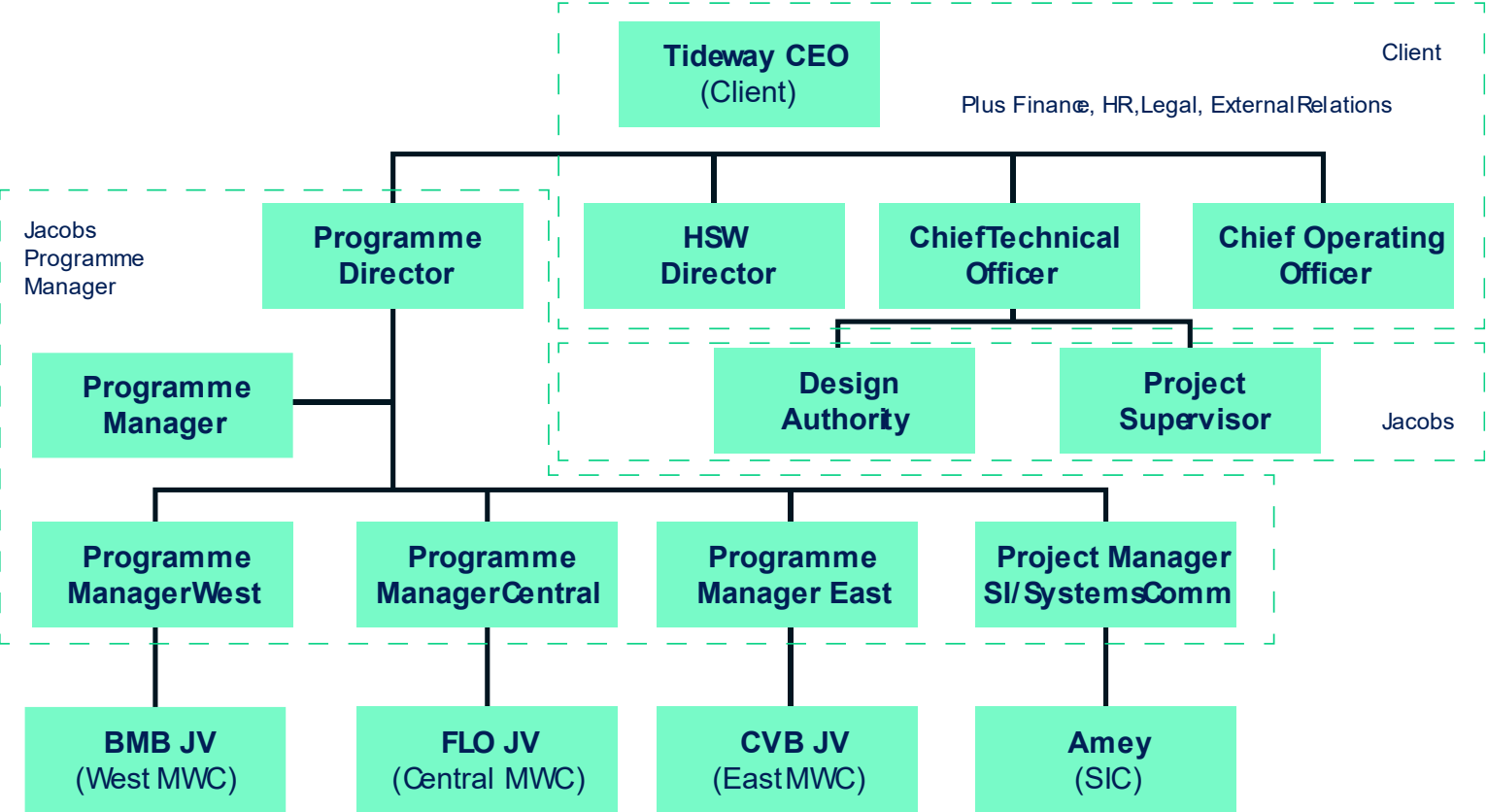
Tideway



Timeline



Jacobs role – Delivery Partner



Principal Contractors



Risk Based Reporting

integrated PMO Team



1. Jacobs – trusted partners
2. Pre 2018 – what we did
3. Challenges
4. Post 2018 – what we do and how we do it
5. What we do well / conclusion

A forecast is a journey, take a great team with you.

Jacobs role on the Tideway programme is to be a Delivery Partner... a trusted partner to Tideway at all levels - as Project Manager's on site, as Design Authority and Project Supervisor, at a Delivery Manager level coordinating the Areas, and within the Programme Management Office.

The trust placed in Jacobs is nowhere more evident than in the PMO / Project Controls Function – where our key objective is to provide a robust forecast that the leadership team understands, accepts, and are willing to stand behind, because they trust the people and the processes followed.

Pre-2018, Non-Risk Based Reporting

- Schedule, cost and risk reported as single point figures.
- The pressure applied by the two-year Strategic Target Baseline resulted in a more critical programme with concurrent critical paths more sensitive to risk events.
- The QSRA outputs were not sufficiently communicated alongside the reported schedule outputs.
- MWC's position (as typical of the NEC3 Option C) reflecting their interpretation of the works, consenting constraints and elements of commercial considerations.
- Insufficient early engagement of all stakeholders in the forecast assumptions and their implications.
- Differing perspectives between Jacobs and Tideway as to what/how major risks should be incorporated into the forecast.

The above resulted in:

- Multiple versions of the truth i.e. the MWC's, Jacobs' and Tideway.
- The Independent Technical Assessor (ITA) faced challenges in assessing the reported forecasts.
- A progressive loss of confidence in schedule and cost outputs when measured against actual performance.
- Iterative rework of the reported position as assumptions and exclusions are varied.
- A desire in Tideway for a more stable forecast, cognisant of risk.



Significant Risk Events modelled via Schedule/Risk/Cost/Change integration



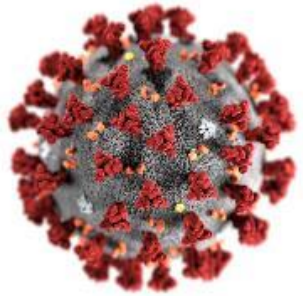
Kirtling Street Obstructions



Chambers Wharf
Diaphragm Wall Collapse



Greenwich TBM delivery utility issues



COVID-19



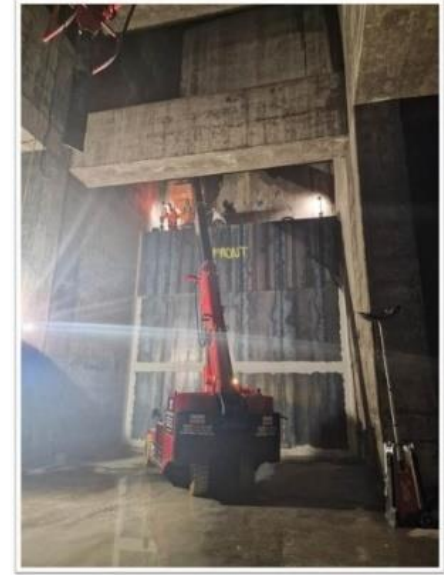
Blackfriars Gas Main Utility Diversion



MWC Interfaces



King Edward Memorial Park
Foreshore Cofferdam
Stability



Abbey Mills Bulkhead
Factor of Safety

Post March 2018 – Risk Based Reporting



Tool Kit / Integration

TOOL KIT FOR PROJECT CONTROLS
Info: centralprojectcontrols@tideway.london

ASITE	Contract Admin & Doc. Management
SharePoint	Collaboration
ASSAI	Doc. Management, Legacy and TIG
ORACLE PRIMAVERA RISK ANALYSIS ARM	Risk Management
PRIMAVERA P6	Schedule
ACUMEN	Schedule, Analytics, Forensics
EcoSys	Cost Management

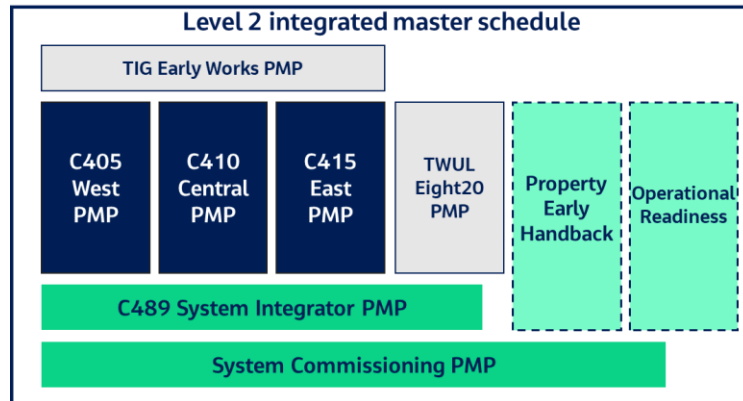


Robust & Static PBS
(Programme Breakdown Structure)

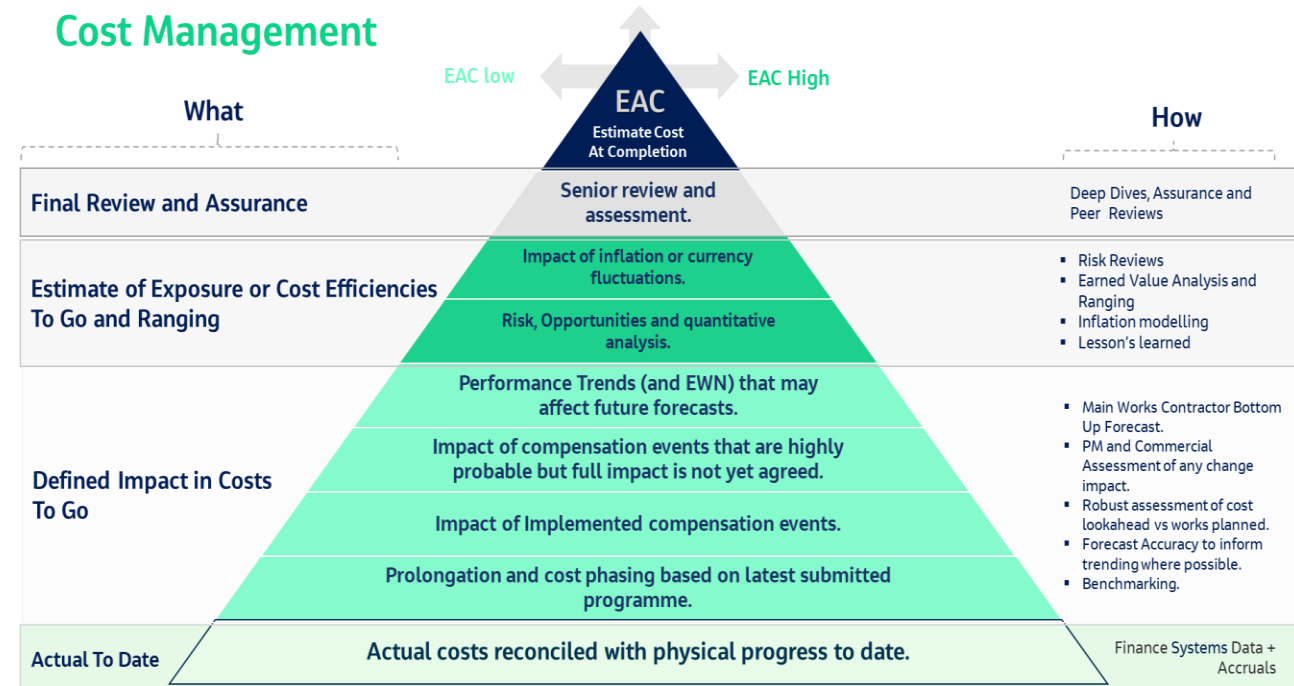
Integration

Schedule Management

Hierarchy of Programme	Info Flow	MWC Contract Specific	Programme Manager	Who / Owner	Purpose	Detail
LEVEL 1 Strategic Summary Programmes	Detail Summarises Up with Alliance integrated view applied Detail informs targets below	Strategic Summary Programme (WI-0500-98 to 101) TILOS Summary Time Chainage Programme (WI-0500-102 to 104)	Strategic Summary Programme TILOS Summary Time Chainage Programme	Delivery Director / Delivery Managers / Project Directors	High Level Overview / Reporting	1 page (P6/TILOS)
LEVEL 2 Project Master Programme (PMP)		Summary Programme (WI-0500-105 to 107)	PMP – Project Master Programme Consisting of the integration of 1. West PMP 2. Central PMP 3. East PMP 4. Systems Integration PMP 5. Eight20 / TWUL 6. System Commissioning	Delivery Managers / Project Directors / Construction Managers	Reporting / Modelling Strategic Scenarios	1,000 – 1,500 activities per Delivery Area (P6)
LEVEL 3 Programme for Acceptance (NEC Clause 31 and 32)		Programme for Acceptance (NEC Clause 31 and 32 and WI-0500-108 to 148 and 154 to 163) Programme Narrative (WI-0500-149 to 150 and 164 to 165) Baseline Programme (WI-0500-79 to 83)		Delivery Managers / Project Directors / Construction Managers / Senior Project Managers	Delivery / Execution / Contract Admin (CE) / Reporting / Modelling Detailed Scenarios	10,000 – 15,000 activities per contract (P6)
LEVEL 4 Medium Term Look-ahead Programmes		Medium Term Plans (not WI requirement) Subcontract Programmes (WI-0500-165)		Senior Project Managers / Project Managers	Delivery / Execution	Weekly / Monthly (Various)
LEVEL 5 Weekly Look-ahead Programmes		Weekly programmes (WI-0500-166 to 171)		Project Managers / Engineers / Foreman	Delivery / Execution	Daily / Weekly (excel)



Cost Management



Post-2018 - Risk Based Reporting

1. We put risk at the heart of our approach
 - a) Quarterly P50 mid case with Schedule & Cost Ranges
 - b) Whole team exercise – educating & demystifying the Area teams and Tideway
 - c) Automated tools and graphics – critical path dashboards, QSRA burn rate calculation tool
2. Reporting Cadence – our drumbeat
3. Promoted a culture of trust, transparency and no-surprises
 - a) Early engagement with the Tideway Executive
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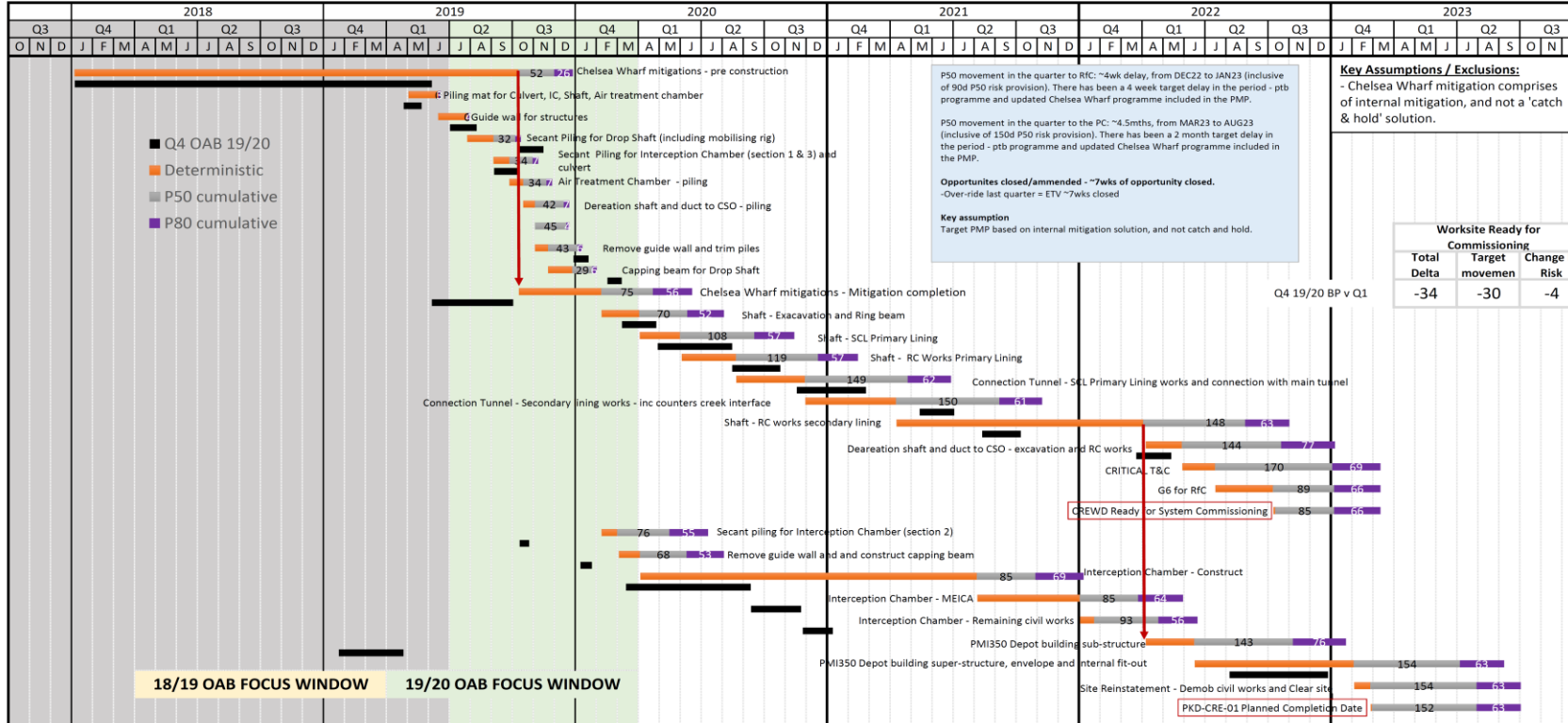


Automated Tools

CREMORNE

Current Programme (May 2019) + P50 Overlay + P80 Overlay

Delta Key : negative = delay
positive = gain



NEAR TERM MILESTONES			TOP RISKS			OPPORTUNITIES			
Description	19/20 BP	Q1 P50	Delta	Description	Prob.	Impact / Saving (min : mod : max)	Description	Prob.	Impact / Saving (min : mod : max)
CREWD Commence secant piling for hydraulic structure	30-May-19	16-Aug-19	-79	Risk that internal mitigation is not feasible and that an external catch and hold structure is required.	10%	21wk : 40wk : 60wk	PM Schedule challenge pending PTB	closed	7wks
a CREWD Gate 5 design complete Civils / MEICA	21-Nov-19	14-Oct-19	38	Risk of exceeding the noise and air quality threshold limit	80%	2wk : 8wk : 12wk	Extra Low Duration Uncertainty to account for concurrency in piling works with 2 rigs	closed	50% to 100% of duration
b CREWD Complete Chelsea Wharf Mitigation	06-Mar-20	11-May-20	-66	Assumption the connection tunnel dia. maintained unchanged up to the extrados of the main tunnel	25%	6wk : 9wk : 12wk	Chelsea wharf has been delinked from piling with the exception of the interception chamber piles adjacent to the building. This allows the majority of critical civils works to commence	closed	
				Ground conditions during civils works (shaft sinking, Interception chamber, CTs, etc.) worse than anticipated (outside GBR)	50%	4wk : 10wk : 13wk	Potential opportunity that the CW damaging activity will not be the shaft excavation, and will instead be the shaft SCL works	80%	1wk : 1.5wk : 2wk
				Chelsea Wharf Assumption - 15wks is enough to install the mitigation	35%	4wk : 8wk : 12wk	Removal of G6 logic link to Readiness for Commissioning	100%	12wk : 12wk : 12wk
				Worksite wet testing of hydraulic structures - incorrect assumptions	70%	3wk : 4wk : 5wk		NEW	

STRATEGIC MILESTONES			
Description	19/20 BP	Q1 P50	Delta
Ready for System Commissioning	20-Dec-22	23-Jan-23	-34
Planned Completion	22-Mar-23	17-Aug-23	-148

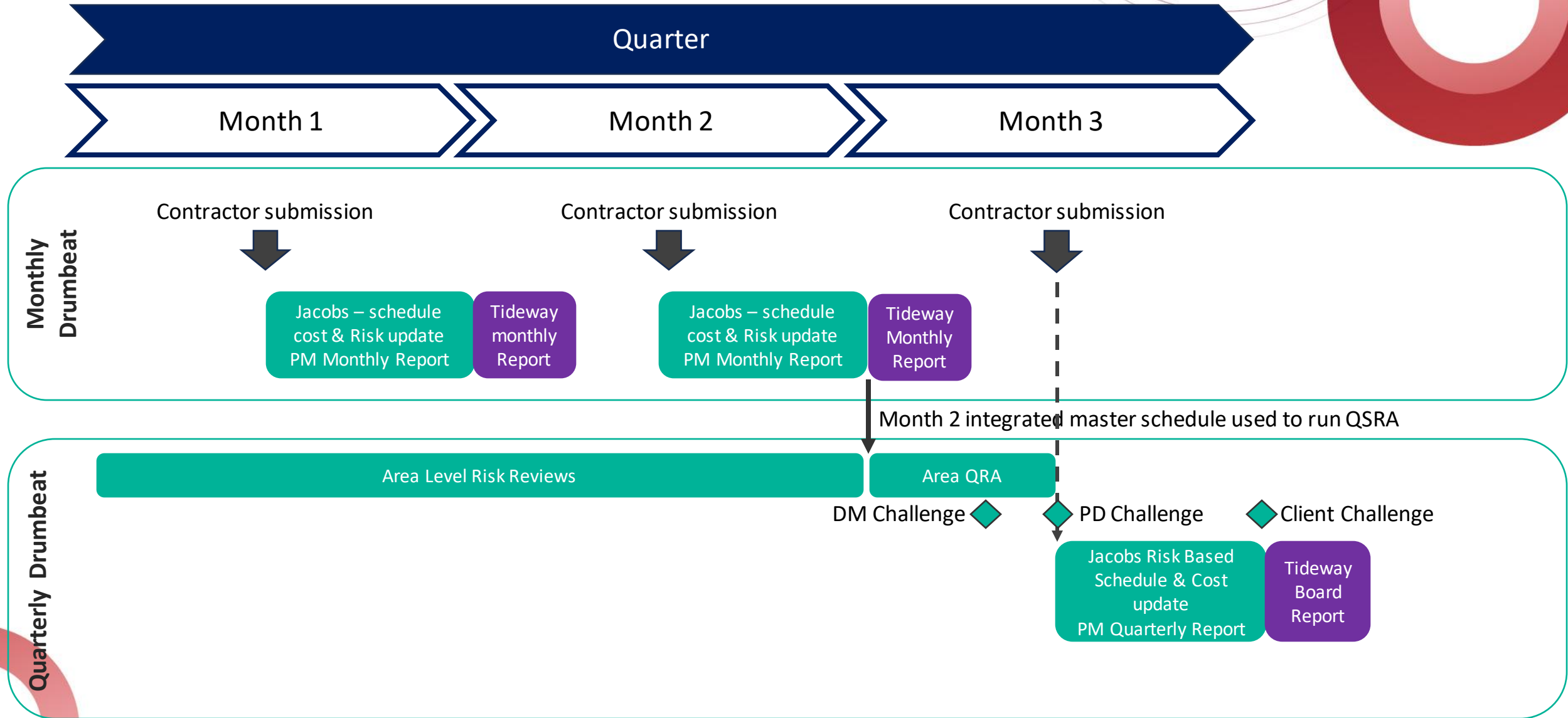


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Reporting Cadence

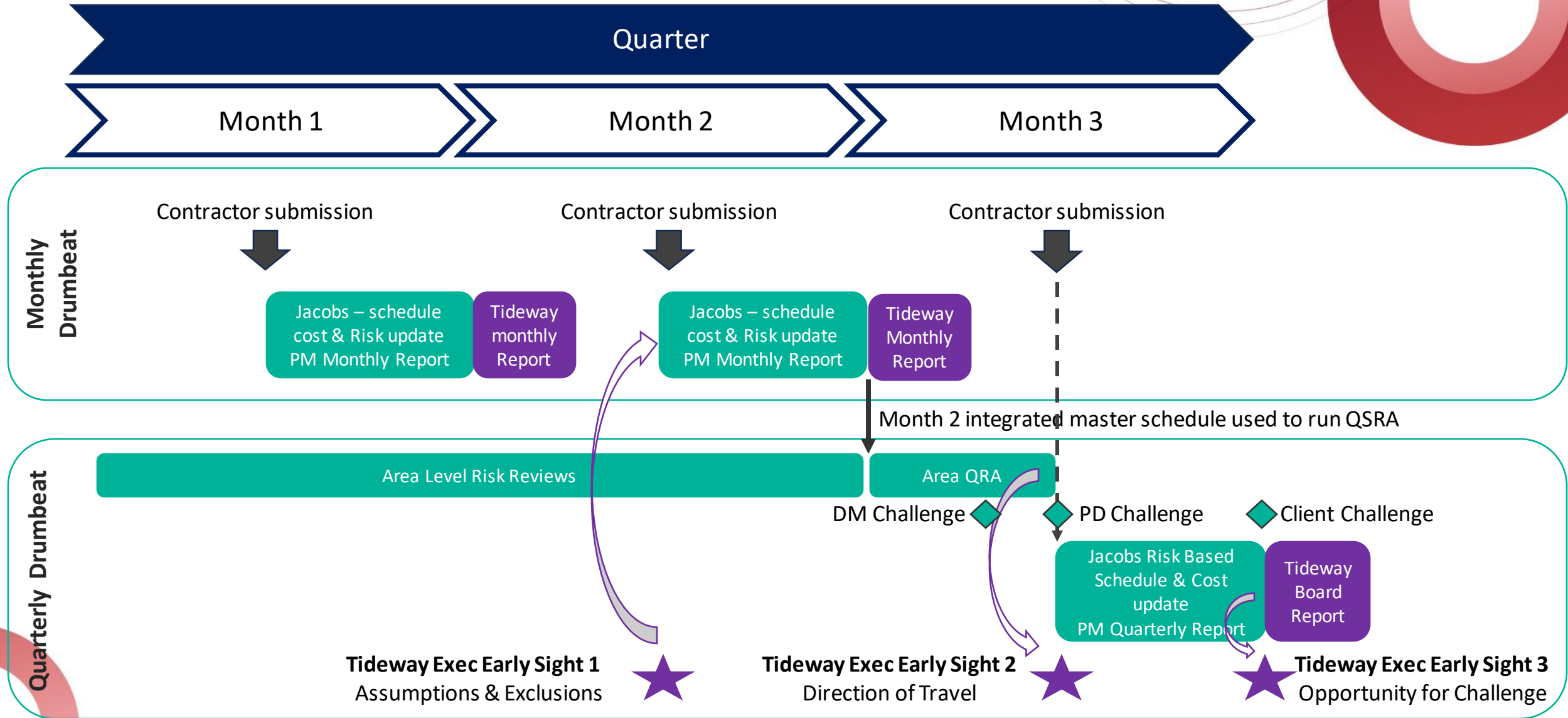


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Early Client Engagement



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Risk Based Reporting and an Informed Client

Conclusions



Conclusion

- Established a culture that supports effective delivery. Psychological safety allows for a no blame culture where people can speak/report the truth.
- The early engagement of the Tideway Executive including them in the decision making and assumption setting.
 - Led to an informed client
 - Limited the amount of re-work required to reporting and provided a more stable data set for the ITA to assure/comment on.
- Integration of client/Programme Manager PMO - a highly skilled team that has a comprehensive understanding of not just the programme delivery requirements but also corporate and stakeholder needs.
- An engaged board and shareholders who are well informed and understand the risks involved in delivering a complex programme of works.
- Forecasting the acceptance of the Tideway Programme by Thames Water at the end of 2026, before the Planned System Acceptance Date of August 2027 (date in license) and within the original forecast cost to bill payer of £20-25 per annum.





THANK YOU