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Agencia de Promoción de la Inversión Privada - Perú

# HEADWORKS AND CONDUCTION WORKS FOR THE DRINKING WATER SUPPLY IN LIMA

INVESTMENT OPPORTUNITY  
MARCH 2021

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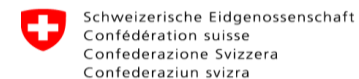
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*Transaction Advisory led by IFC*



*In partnership with:*





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# PROJECT SUMMARY

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# Summary of the investment opportunity

Investment opportunity for a Public-Private Partnership (PPP) with the Government of Peru to design, finance, build, operate, maintain and transfer the works required to provide 5 m<sup>3</sup>/s of drinking water for the city of Lima

**Objective:** Increase the availability of drinking water to cover the demand of the districts in the east and south of Lima, using surplus water from the Rimac and Yauli rivers.

**Location:** Provinces of Yauli/Junin and Lima.

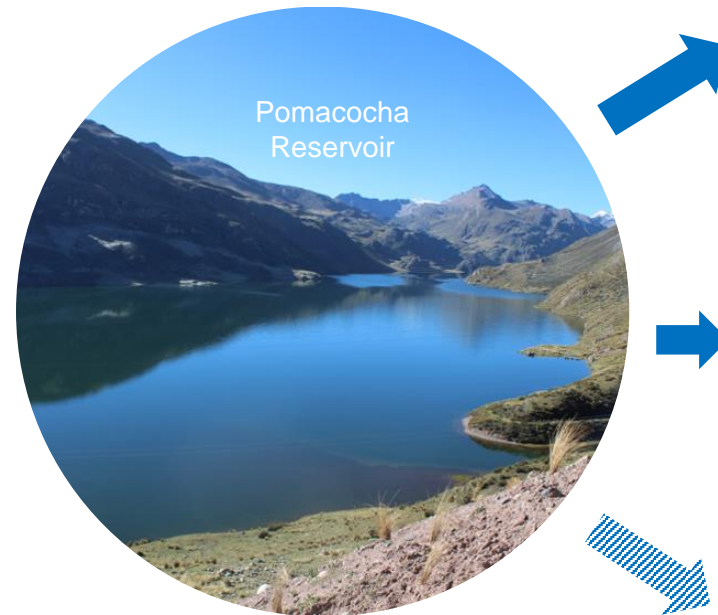
**Scope:** Design, Finance, Construct, Operate, Maintain and Transfer.

**Type of concession:** Self-financed.

**Estimated Capex:** US\$ 480 million (excluding Taxes).

**Concession term:** 30 years.

**Current Status:** Structuring stage.



# Structuring Team

  
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 **ProInversión**  
 Agencia de Promoción de la Inversión Privada - Perú

*Lead transaction and financial advisor*

 **IFC** | **International Finance Corporation**  
 WORLD BANK GROUP



 **Lombardi**  
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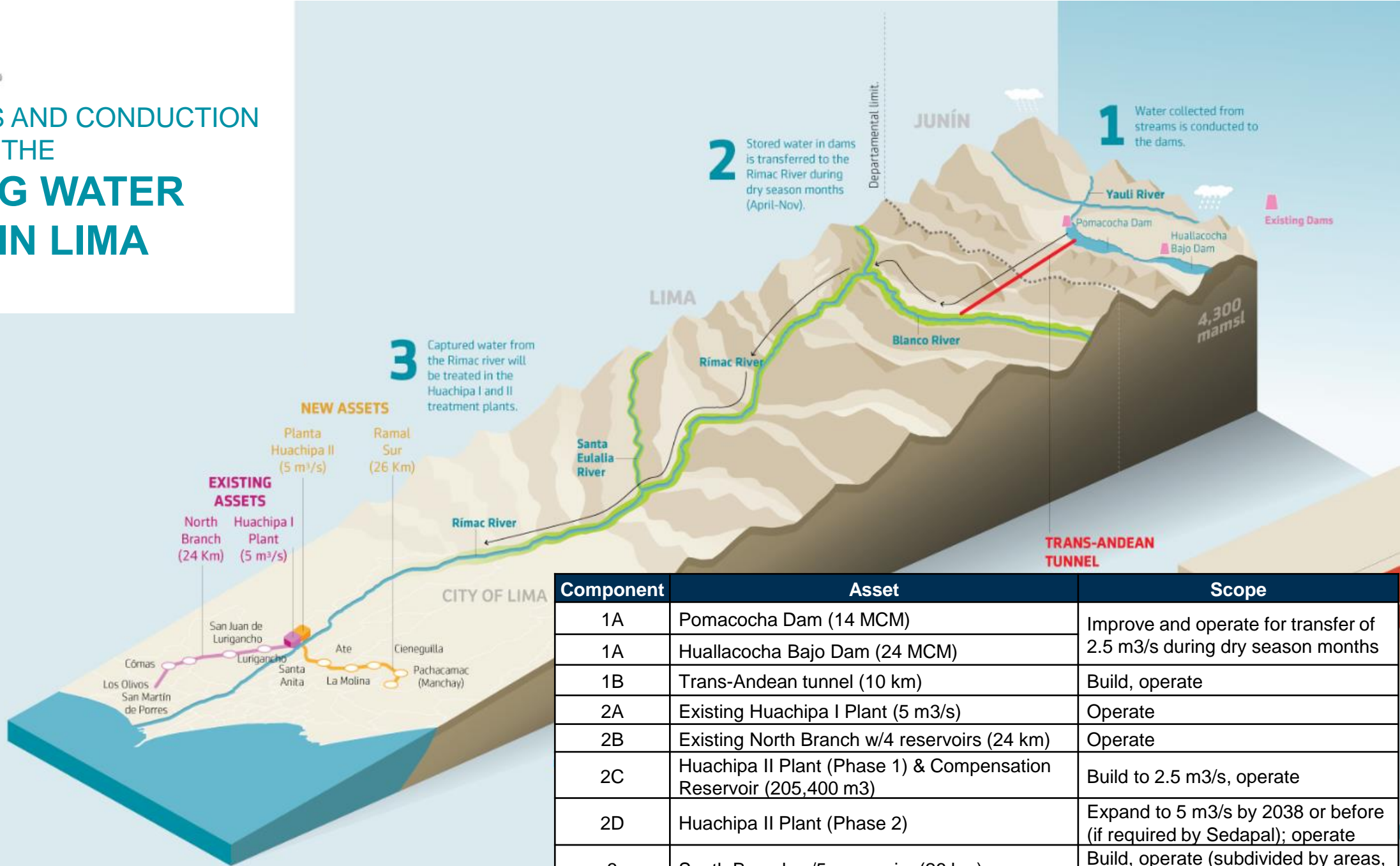
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**ALLEN & OVERY**

 **JGP** Consultoria e Participações Ltda.

**LLORENTE & CUENCA**



# HEADWORKS AND CONDUCTION WORKS FOR THE DRINKING WATER SUPPLY IN LIMA



**PROJECT'S LOCATION**



Benefited population:  
**1.5 million**

Project's term:  
**30 years**

Estimated CAPEX

**US\$480 million**

+ Sales Tax (18%):

Component	Asset	Scope
1A	Pomacocha Dam (14 MCM)	Improve and operate for transfer of 2.5 m <sup>3</sup> /s during dry season months
1A	Huallacocha Bajo Dam (24 MCM)	
1B	Trans-Andean tunnel (10 km)	Build, operate
2A	Existing Huachipa I Plant (5 m <sup>3</sup> /s)	Operate
2B	Existing North Branch w/4 reservoirs (24 km)	Operate
2C	Huachipa II Plant (Phase 1) & Compensation Reservoir (205,400 m <sup>3</sup> )	Build to 2.5 m <sup>3</sup> /s, operate
2D	Huachipa II Plant (Phase 2)	Expand to 5 m <sup>3</sup> /s by 2038 or before (if required by Sedapal); operate
3	South Branch w/5 reservoirs (26 km)	Build, operate (subdivided by areas, in Components 3A, 3B, 3C and 3D)
3	Interconnection lines (66 km)	Build and revert to Sedapal



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# DESCRIPTION OF INTERVENTIONS

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## Component 1A (Pomacocha - Huallacocha Bajo Dam System)

### Pomacocha Dam

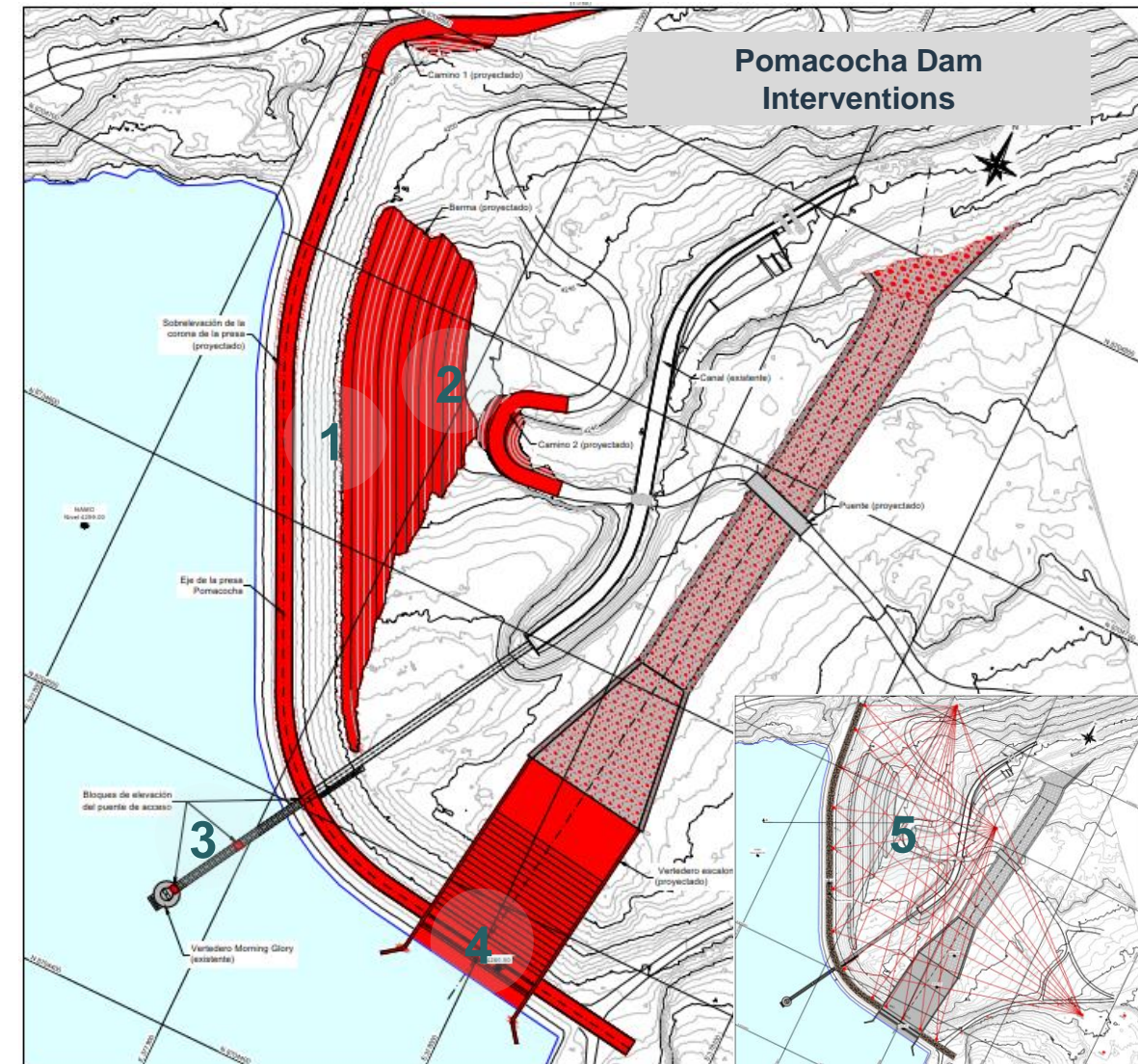
**Scope of the studies:** to implement adjustments and/or modifications necessary to the existing Pomacocha - Huallacocha Bajo dam system that allow a transfer to the Blanco River in the dry season of approximately 2.5 m<sup>3</sup>/s, in compliance with national and international regulations for dam safety.

#### Main interventions:

1. Dam crest heightening by a new dam crest structure and parapet wall ( $\Delta H$ =approx. 2.1 m).
2. Additional berm downstream embankment to assure seismic stability of the dam (approx. 20,000 m<sup>3</sup>).
3. Minor improvements of the existing morning glory spillway to be able to discharge design flood.
4. Auxiliary spillway on the right abutment to discharge extreme floods (B=50m approx.).
5. New monitoring system according to international practice.

#### Characteristics of the dam after interventions:

- i. Dam height: 23.50 m
- ii. Crest length: 430 m
- iii. Crest elev.: 4,262.50 m asl
- iv. Max oper. level: 4,259.00 m asl
- v. Min oper level: 4,252.50 m asl
- vi. Reservoir vol.: 24 hm<sup>3</sup> (same as current)
- vii. Live storage vol.: 14 hm<sup>3</sup>





## Component 1A (Pomacocha-Huallacocha Bajo Dam System)

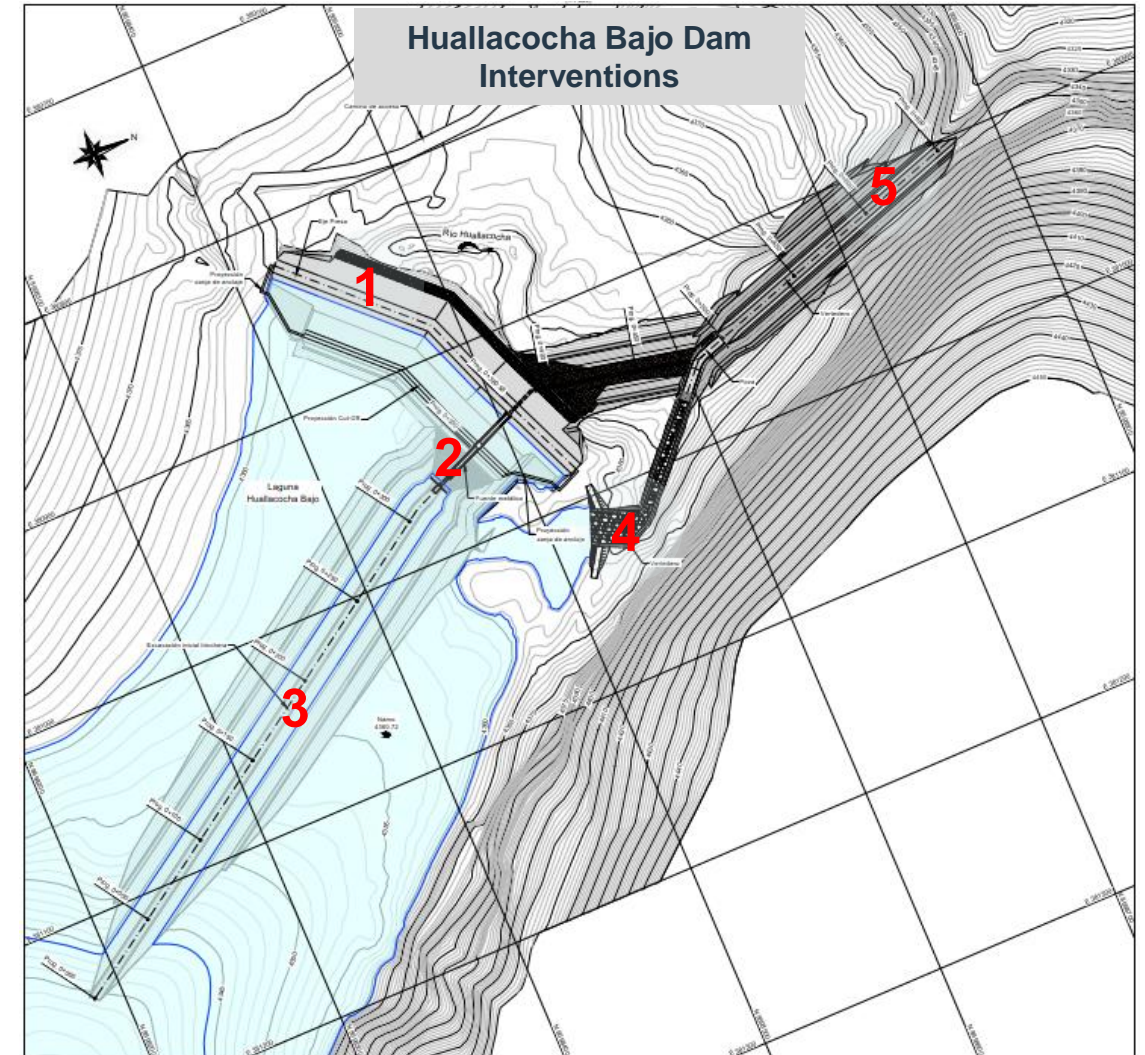
### Huallacocha Bajo Dam

#### Main interventions:

1. Dam re-construction with a safer impervious system on the up-stream embankment (Fill volume = approx. 40,000 m<sup>3</sup>).
2. New intake to regulate the discharge into Yauli river toward Pomacocha reservoir (Discharge capacity Q = 2.5 m<sup>3</sup>/s).
3. New intake inlet channel to improve live storage volume (Excavation volume = approx. 230,000 m<sup>3</sup>).
4. Existing spillway minor rehabilitation to safely discharge extreme floods.
5. Outlet works combining the spillway and outlet outflows (L = 260 m approx.).

#### Characteristics of the dam after interventions:

- i. Dam height: 8 m
- ii. Crest length: 220 m
- iii. Crest elev.: 4,362.34 m asl
- iv. Max oper. level: 4,360.72 m asl
- v. Min oper. level: 4,344.00 m asl
- vi. Reservoir vol.: 58 hm<sup>3</sup> (same as current)
- vii. Live storage vol.: 24 hm<sup>3</sup>



## Component 1B (Trans-Andean Tunnel)

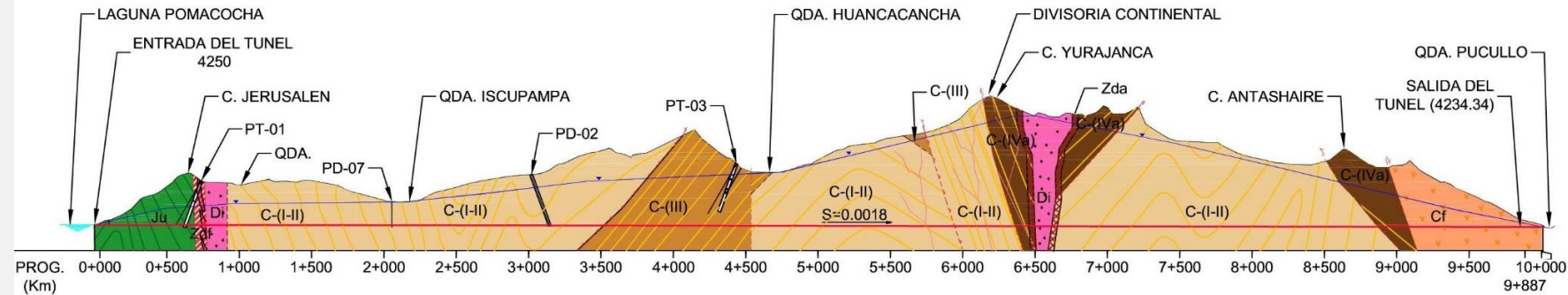
### Trans-Andean Tunnel

Trans-Andean free flow water transfer tunnel (Min Q = 2.5 m<sup>3</sup>/s).

#### Main works:

- Inlet structure into Pomacocha reservoir (Atlantic side).
- Water transfer tunnel L=10 km, cross section horseshoe shaped H = avg. 4.0 m.
- Outlet in the Pucullo - Rio Blanco River (Pacific side).

Longitudinal profile: geological interpretation based on available investigations and existing studies (CES Saltzgitter 1998, Nippon-Koei 2014, Lombardi 2019/2020)



Area view

- The tunnel will be excavated in Drill & Blast (D&B) or Tunnel Boring Machine (TBM).
- Typical regional rocks alternance including limestone, diorite, siltstones, claystones, conglomerates and sandstones.
- 5 typical rock mass support (RMR - Bieniawski) and special support system for squeezing and rock burst sectors.



# Components 2A & 2B (Huachipa I Plant & Northern Branch) (Operation and Maintenance)

## Huachipa I Plant and Northern Branch Description

Rimac river Intake complex with a capacity of 12 m<sup>3</sup>/s comprising:

- ✓ Radial gate intake and screens
- ✓ 3 Horizontal flow desanders (to be built)

Conventional water treatment facility (Coagulation, Sedimentation, Filtration & Disinfection) with a 5 m<sup>3</sup>/s design capacity. Main facilities include:

- ✓ 2 Contact Tanks for Pre-Chlorination.
- ✓ 7 MULTIFLO Units (Coagulation & Sedimentation)
- ✓ 16 Rapid Gravity Sand Filters
- ✓ 1 Treated Water Storage Tank (77,300 m<sup>3</sup>)
- ✓ 12 Drying Beds for Sludge Dewatering



Northern drinking water distribution branch from the Huachipa I Plant to the five delivery points located in the Districts of San Juan de Lurigancho, Comas, Los Olivos and San Martín. These are existing assets that only require Operation & Maintenance.

The main characteristics include:

- ✓ Total pipeline length of 27.1 km, with diameters ranging between 2,000 – 800 mm including two tunnel (4.7 and 5.4 km long).
- ✓ 5 delivery points, composed of 4 Compensation Reservoirs and 1 connection line.



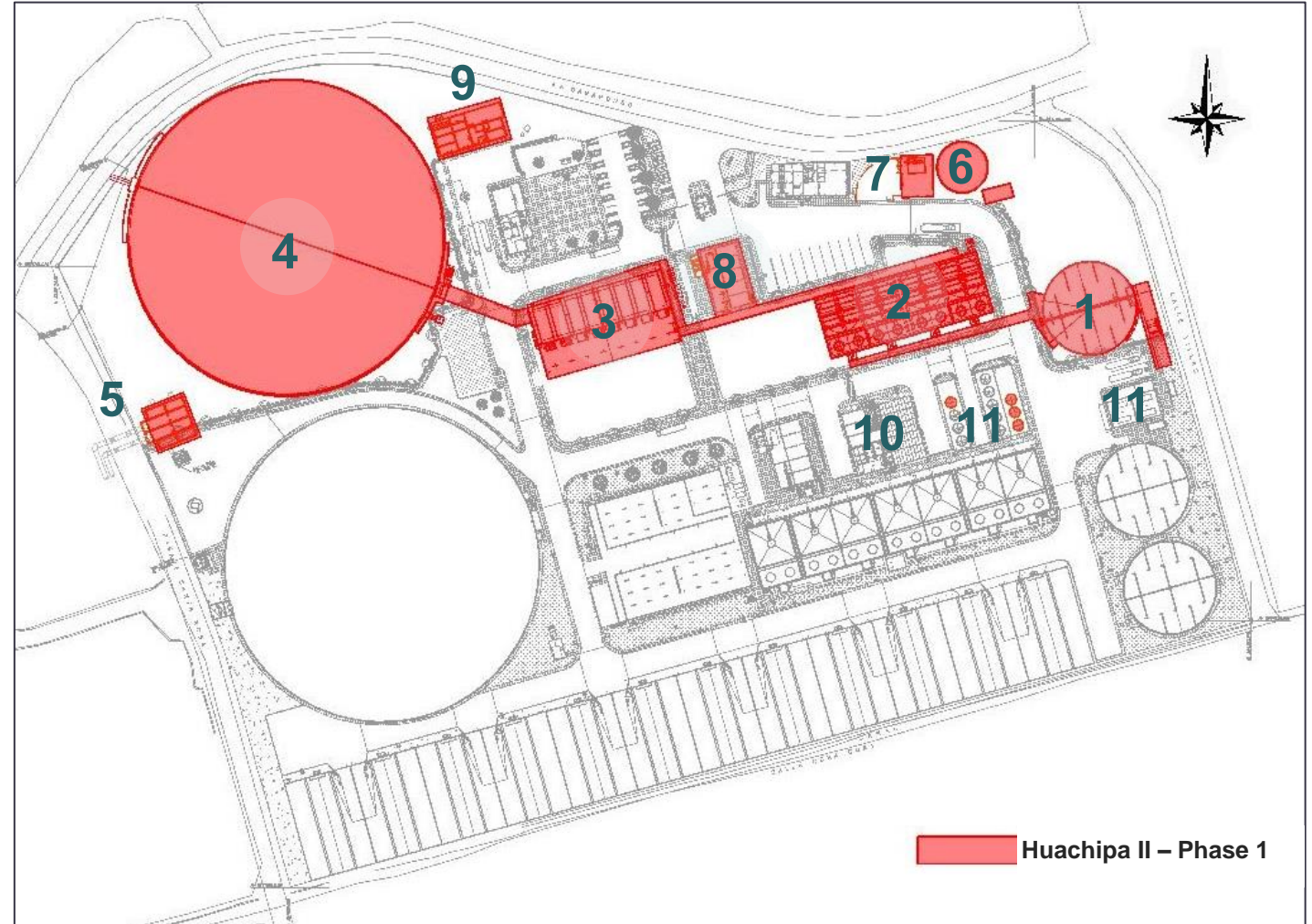
## Component 2C (Huachipa II Plant – Phase 1)

### Huachipa II Plant – Stage 1 Description

The first stage of the Huachipa II Plant foresees the construction of additional facilities to allow the treatment of 2.5 m<sup>3</sup>/s of water. This will increase the overall treatment capacity in Huachipa from 5 m<sup>3</sup>/s to 7.5 m<sup>3</sup>/s.

The main new facilities foreseen for Huachipa II – Phase 1 include:

1. Contact tank for pre-chlorination (1).
2. Coagulation & sedimentation units (4).
3. Rapid gravity sand filters (8).
4. Treated water storage tank (77,300 m<sup>3</sup>) (1).
5. Collector chamber for the conduction branches (1).
6. Sludge storage tank (2,500 m<sup>3</sup>) (1).
7. Sludge dewatering building (1).
8. Electric room for the Huachipa II processes (1).
9. Maintenance workshop building for both plants (1).
10. Expansion & update of SCADA technology.
11. Expansions to the chemical preparation and dosing systems.



## Component 2C (Huachipa II Plant – Phase 1)

### Complementary Reservoirs

- Manzana Q: Two reservoirs (100m x 120m x 10.20m, each).
- Additional Storage volume: 205,400 m<sup>3</sup> (Total 360,000 m<sup>3</sup>).
- To satisfy demand for 10 hours with Q=10 m<sup>3</sup>/s.
- Allows water supply to the North and South Branch Systems in case of a high turbidity event in the Rimac river that reduces water production capacity at Huachipa I and II plants.



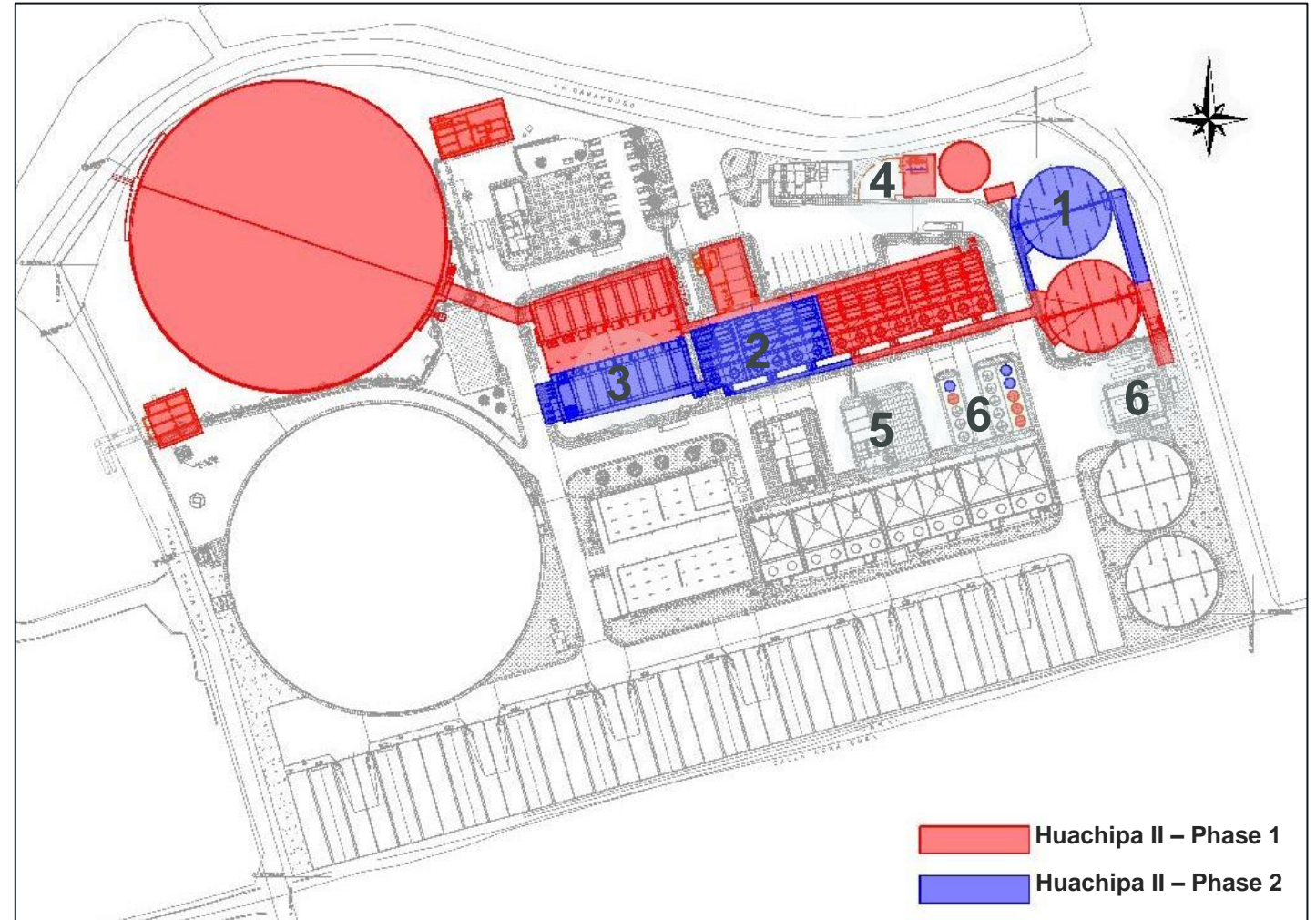
## Component 2D (Huachipa II Plant – Phase 2)

### Huachipa II Plant – Stage 2 Description

The second phase of the Huachipa II plant foresees the construction of additional facilities to allow the treatment of 2.5 m<sup>3</sup>/s of water. This will increase the overall treatment capacity in Huachipa from 7.5 m<sup>3</sup>/s to 10 m<sup>3</sup>/s.

The main new facilities foreseen for Huachipa II – Stage 2 include:

1. Contact tank for pre-chlorination (1).
2. Coagulation & sedimentation units (3).
3. Rapid gravity sand filters (8).
4. Additional centrifuge equipment in the sludge dewatering building.
5. Expansion of the SCADA technology.
6. Expansions to the chemical preparation and dosing systems.



## Component 3 (South Branch)

### Main line (26 km) and 5 compensation reservoirs

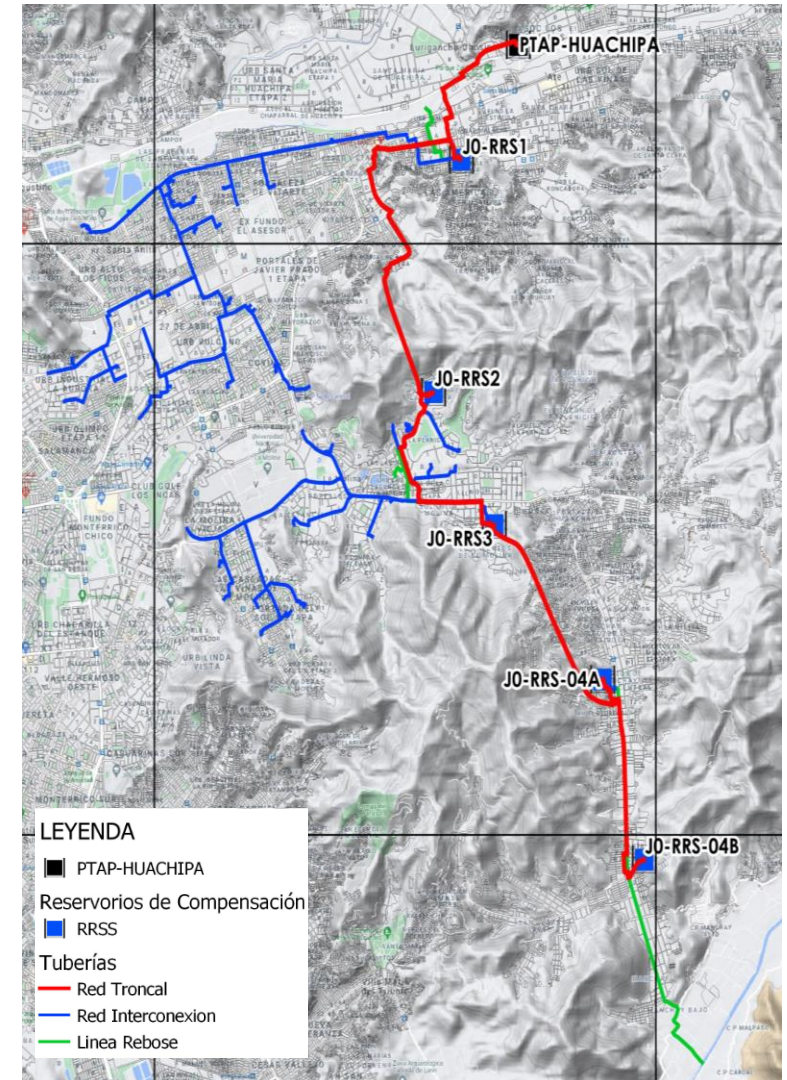
- Outflow discharge from PTAP Huachipa to Ramal Sur: 6.195 m<sup>3</sup>/s
- Total length of the pipeline in ductile iron: 26 km
- The line will cross 2 tunnel of total length: 6.7 km
- Design inflow range: 0.2 – 3.8 m<sup>3</sup>/s

### Interconnection lines (66 km)

- 66 km pipeline in Ductile Iron
- Pipeline integrates existing and planned distribution systems and secondary storage reservoirs: Ceres (39 km), La Planicie (6 km), Sol de La Molina (20 km), Manchay A (0.5 km), Manchay B (0.1 km)

### Overflow lines (16 km)

- Reservoir overflow design discharge = 80% main discharge (m<sup>3</sup>): Ceres (3.0), La Planicie (0.16), Sol de La Molina (1.29), Manchay A (0.29) y Manchay B (0.20).
- 16 km pipeline in ductile iron
- Pipeline has pressurized flow.



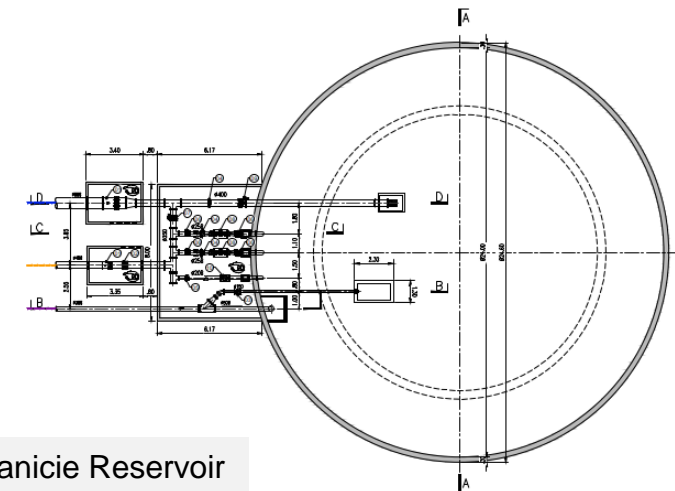
## Component 3 (South Branch)

### 5 Compensation reservoirs

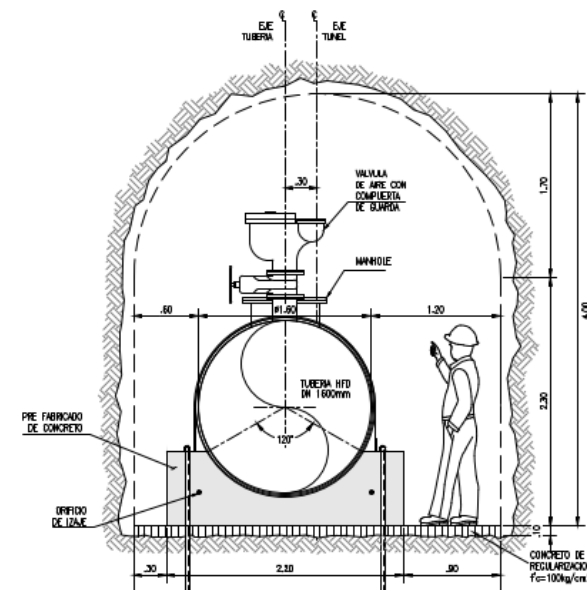
Reservoir	Required volume (m <sup>3</sup> )	Shape	Dimensions (m)	Depth (m)	Supply districts
RRS 01 Ceres	33,000	Rectangular	95.5 x 59.0	6.0	Ate, Santa Anita, La Molina
RRS 02 La Planicie	2,000	Circular	24	6.0	La Molina
RRS 03 Sol de La Molina	23,500	Circular	50.5	6.0	La Molina, Cieneguilla
RRS 04A Manchay	6,000	Rectangular	38 x 38	4.5	Pachacamac
RRS 04B Manchay	4,500	Circular	31.5	6.0	Pachacamac

### 2 Tunnels

- Two tunnels with total length of 6.7 km
- Tunnel 1 (2.3 km): Inlet in Ate and outlet in La Molina Ø 1'600 mm
- Tunnel 2 (4.4 km): Inlet in La Molina and outlet in Pachacamac Ø 1'000 mm



La Planicie Reservoir



Typical Section of tunnels







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# CONCESSION STRUCTURE

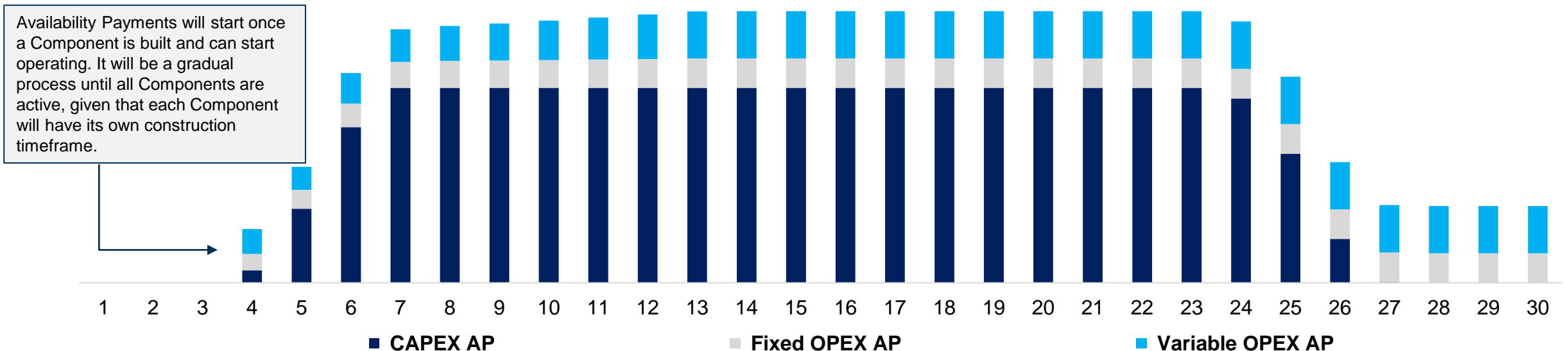
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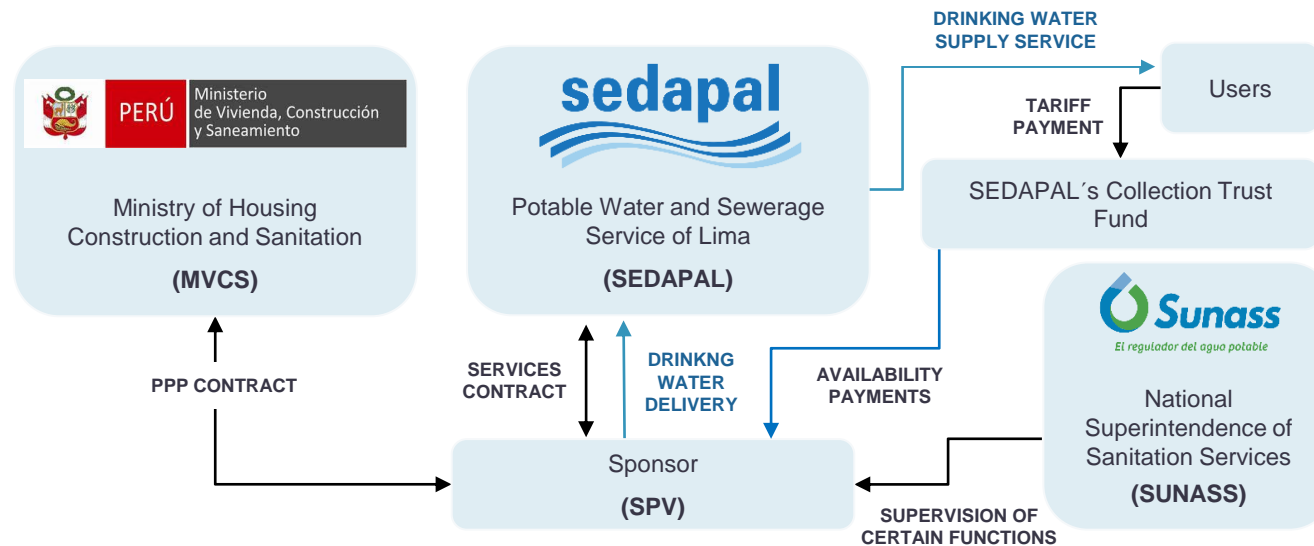
## Financial Structure

- Concession Term: **30 years**.
- For completing the infrastructure and delivering drinking water to SEDAPAL, the concessionaire will receive 3 types of Availability Payments (AP), paid on a quarterly basis:
  1. **Investment AP:** Covering capex and financing for all Components.
  2. **Fixed Opex AP:** Covering fixed operating costs for all Components.
  3. **Variable Opex AP:** Covering variable operating costs, for each m3 of drinking water produced and delivered at specific delivery points.
- Each Component will receive its own Investment and Fixed Opex APs. APs will start when the corresponding Component is successfully built and can start operating.
- Investment APs will be paid on a quarterly basis for 20 years (80 quarterly payments). Fixed and Variable Opex APs will be paid quarterly until the end of the concession term.
- For the Trans-Andean tunnel only (Component 1B), Investment APs will be paid based on actual construction costs (unit prices per rock type, multiplied by linear meters measured during construction for each rock type). Payments will commence by a contractually defined date.
- Key Performance Indicators (KPIs) will be measured throughout the contract's execution. APs may be adjusted downwards if performance falls below KPIs thresholds.

### Availability Payments – illustrative representation (Phase 1 works only)



## Concession Structure



- The Project will require the creation of a Special Purpose Vehicle (SPV). The SPV must demonstrate experience in financing, construction and operation of similar projects, as stated in the bidding documents.
- The SPV will sign a PPP Contract with the Ministry of Housing, Construction and Sanitation (MVCS) acting as grantor for the Government of Peru.
- The SPV will sign a Services Agreement with Sedapal for the delivery of drinking water (Annex to the Concession Agreement).
- The SPV will receive Availability Payments from Sedapal for the infrastructure and for the service provided, in compliance with contractual requirements. Sedapal will generate tariff revenues from the sale of water, which will be directly channeled to the SPV through Sedapal's existing Collection Trust Fund.
- The National Superintendence of Sanitation Services (SUNASS) will supervise certain activities under the PPP Contract.





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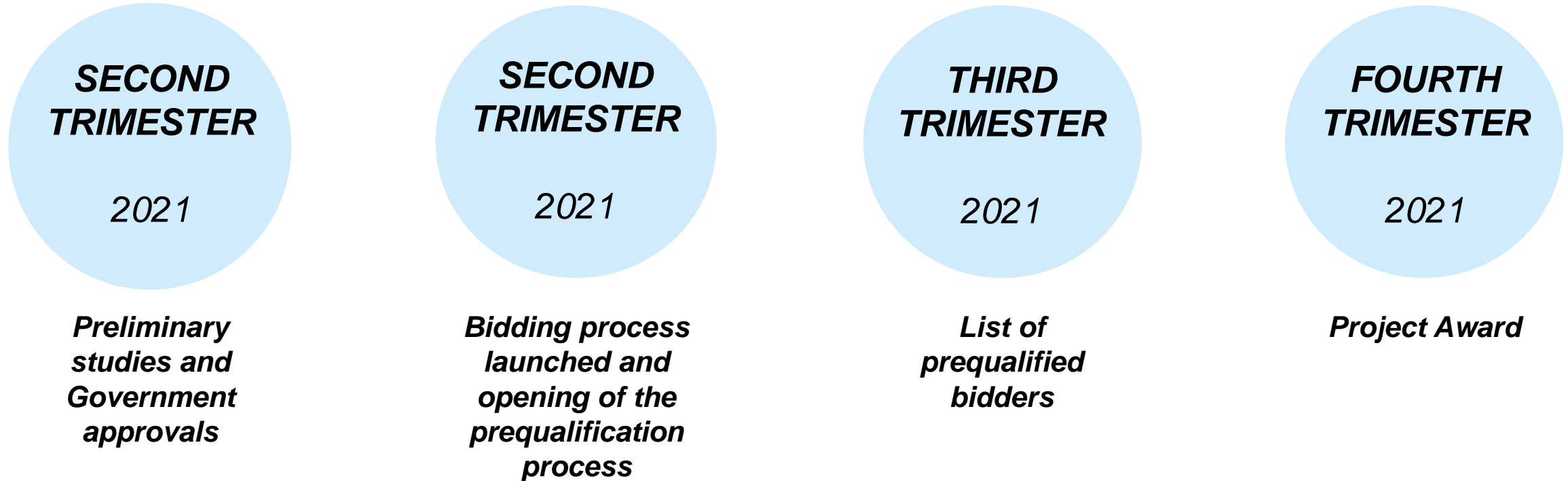
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# TIMELINE AND CONTACTS

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## Estimated Key Dates



Note: Dates are indicative and subject to change. For the most updated timetable visit:  
<https://www.investinperu.pe/es/app/DatosProyecto?idAPPProyecto=61>



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