2 June 2020

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Mike Young
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via email: steve.o'donoghue@planning.nsw.gov.au

Dear Mike,

RE: DENDROBIUM MINE – RESPONSES TO QUERIES REGARDING SURFACE WATER OFFSET COMMITMENTS

In response to your letter dated 20 April 2020, please find enclosed (Enclosure 1) additional information regarding the commitments for the *Dendrobium Mine – Plan for the Future: Coal for Steelmaking* (the Project) to offset predicted surface water losses from the Metropolitan Special Area to achieve a net gain to metropolitan water supplies.

As described in the Submissions Report, the Project surface water losses are predicted to be negligible at the catchment scale.

The Independent Expert Panel for Mining in the Catchment's (IEP) Part 2 Report notes that its estimates of cumulative losses from Sydney's drinking water catchment from the Dendrobium, Russell Vale and Wongawilli mines of 8 ML/day are "low" when compared to other components of the drinking water network (by comparison the maximum predicted surface water losses from the Project are 5 ML/day):

> *The* [surface water] *losses referred to in Section 3.2.3 are low compared to other components of Sydney's supply and demand, for example recent losses from the Dendrobium, Russell Vale and Wongawilli mines of less than 8 ML/day on average compare to the Sydney Desalination Plant capacity of approximately 250 ML/day (Sydney Desalination Plant, 2019) and estimated leaks from the Sydney Water supply infrastructure of approximately 130 ML/day (Sydney Water, 2018).*

Similarly, the Independent Expert Scientific Committee (IESC) in their submission on the Project, notes the predicted reduction to Sydney's drinking water supply is "*unlikely to be of material concern*".

Notwithstanding, South32 outlined its commitments to offset predicted surface water losses in the Submissions Report.

We note the Department's support for South32's commitment to implement or fund works such that the Project results in net gain to Sydney's drinking water supplies from subsidence-related surface water losses from the Metropolitan Special Area (refer letter dated 20 April 2020):

> *The Department fully supports the following high-level commitment by South32 in the RTS, and notes that it is consistent with recent statements from the Minister for Planning and Public Spaces about the need for mining companies in the Special Areas to ensure they make a positive contribution to the broader metropolitan water supply …*
>
> *To allow the Department to consider this issue in the assessment of the project, it would be appreciated if you could provide details about the proposed offsets …*

The purpose of this letter is to provide further detail in regard to South32's commitments, including responses to the information requested by DPIE (Enclosure 1). Please note that South32's existing commitments address the following three separate issues in relation to predicted surface water losses:

1. Predicted reduction in metropolitan water supply.

To offset this predicted impact, South32 commits to implement (i.e. "direct" offset) or fund (i.e. "indirect" offset) works such that the Project results in a net gain to metropolitan water supplies.

The direct offsets would involve the establishment by South32 of water treatment facilities and pipelines (estimated cost of $34M, which would be borne by South32) to facilitate the treatment and beneficial use of mine water by third parties, thereby offsetting incidental surface water take by the Project and associated reduction in metropolitan water supply.

However, while direct offsets are South32's preference, it is noted that agreement by third parties to receive this treated water is outside South32's control. Accordingly, if for reasons outside South32's control, direct offsets are not able to be provided, South32 would provide funding to the NSW Government, with this funding to be used for projects that result in net gain to metropolitan water supplies. The funding would be based on the draft Sydney Water retail price of $2.30/kL ("base scenario") and $3.12/kL ("drought scenario") as defined by the Independent Pricing and Regulatory Tribunal of NSW (IPART) and the volume of predicted surface water loss.

As surface water losses can only be calculated using modelling techniques, the annual volume of surface water losses from the Project would be calculated at the end of each water year (1 July to 30 June) using the groundwater model, which would be re-calibrated to data collected over the previous year (e.g. groundwater pressure, surface water flows, rainfall, evaporation and mine inflows).

We consider the approach described to directly or indirectly offset surface water losses is consistent with the comments in the IEP's Part 2 Report, which identifies the following options to offset predicted surface water losses from the catchment:

- *'purchasing' the water lost from the catchment that can be attributed to mining operations, the financial offset could be used to fund make-up water sources, such as through the operation of desalination plants and borefields, or*
- *treating the water pumped from the mine to a standard that enables it to supplement water that would otherwise be drawn from the Greater Sydney Water Catchment.*

Post-mining, the $34M infrastructure would be gifted to the NSW Government, enabling ongoing access to the reservoir of water that would be stored in the historic mine workings for treatment and beneficial use. If the infrastructure is not commissioned, South32 will relinquish funds of $34M to the NSW Government at the end of the mine life (this funding could then be used by the NSW Government for ongoing projects that result in net gain to metropolitan water supplies).

2. Loss of revenue to WaterNSW

As WaterNSW would not necessarily be the beneficiary of direct or indirect offsets, South32 would make annual payments to WaterNSW during the Project life based on the calculated volumes of annual surface water loss and the price determined by IPART that WaterNSW can sell raw water to Councils ($49.90/ML under a "base scenario", and $59.70/ML under a "drought scenario" – updated from the price as at the time of lodgement of the Project EIS to reflect draft updated IPART pricing).

3. Licensing of surface water losses under the *Water Management Act 2000*

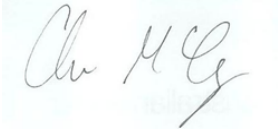
South32 would hold appropriate licences under the *Water Management Act 2000* to account for surface water losses. It is understood from the Minister's 18 April media release that the NSW Government is currently establishing a licensing regime that would allow South32 to appropriately licence surface water losses. These licences would be retired (along with groundwater licences currently held by South32) to account for post-mining losses, as per the preferred process of the NSW *Aquifer Interference Policy*.

South32's commitments over the life of the Project and post-mining are summarised below.

Timing	South32 Commitments to Address Surface Water Losses						
	1. Achieve "net gain" to metropolitan water supplies			AND	2. Compensate WaterNSW for lost revenue	AND	3. Hold appropriate licences
	1a. "Direct" offsets	OR	1b. "Indirect" offsets				
Already occurred							✓ Groundwater licences (>$6M)
Commencement of Project	✓ Capital ($34M)	OR		AND		AND	✓ Surface water ($TBC by Govt)
During Project life	✓ Annual operating costs	OR	✓ Annual funding contribution to NSW Govt based on $2.30/kL ("base") or $3.12/kL ("drought")	AND	✓ Annual funding contribution to WaterNSW based on $49.90/ML ("base") or $59.70/ML ("drought")	AND	✓ Hold licences
Post-mining	✓ Gift treatment facility (capital of $34M already spent)	OR	✓ Relinquish funds of $34M to NSW Govt at the end of the mine life	AND		AND	✓ Retire licences

If you have any queries please don't hesitate to contact me (Chris.McEvoy@south32.net or 0407 060 163).

Yours sincerely
SOUTH32 LIMITED



Chris McEvoy
Approvals Manager
Dendrobium Next Domain Project

ENCLOSURE 1

RESPONSES TO DPIE INFORMATION REQUESTS (20 APRIL 2020)

BACKGROUND

On 20 April 2020, the Department of Planning, Industry and Environment (DPIE) wrote to South32 in regard to the Submissions Report prepared for the *Dendrobium Mine – Plan for the Future: Coal for Steelmaking* (the Project).

In its correspondence, DPIE stated its support for the following commitment outlined in the Submissions Report:

> *South32 commits to implement or fund works such that the Project results in net neutral or net beneficial effects to Sydney's drinking water supplies from subsidence-related surface water losses from the Metropolitan Special Area.*
>
> *This would include beneficial use of mine water to reduce existing demands on the drinking water system, and/or funding or implementing works that reduce existing losses (e.g. pipe losses or evaporation).*

It is noted South32's commitment is consistent with the media release by the Minister for Planning and Public Spaces[1] (dated 18 April 2020) regarding the need to ensure a "*net gain for the metropolitan water supply by requiring more offsetting from mining companies*".

South32 agrees with the Minister's statement and revises its commitment as follows:

> *South32 commits to implement or fund works such that the Project results in a **net gain** to the metropolitan water supply from subsidence-related surface water losses from the Metropolitan Special Area.*

To provide further details regarding this commitment, DPIE requested further information be provided for the following:

[1] • *what water take is to be offset (e.g. loss of surface flows, near surface groundwater, baseflow, and/or stored waters);*

[2] • *whether groundwater take is to be offset, and if so, to what depth or strata;*

[3] • *how water take is to be modelled, measured and/or monitored (which may vary according to the source of water);*

[4] • *what allowance should be made in respect of water quality impacts (e.g. arising from streambed cracking) and how this would be modelled, measured and/or monitored;*

[5] • *how the commitment would work in respect of rising and falling water take during the life of the project;*

[6] • *how the commitment would work in respect of continuing water take following the life of the project; and*

[7] • *whether and how the groundwater component of mine water can be used to offset surface water take.*

[8] *You are also requested to provide additional details regarding potential beneficial uses of mine water or other offsetting measures currently under consideration, together with indicative timetables as to when these initiatives may be able to be implemented.*

Responses to these points 1 to 8 are provided below.

[1] https://www.planning.nsw.gov.au/-/media/Files/DPE/Media-Releases/2020/April/media-release-stronger-protection-for-sydneys-water-catchment-following-extensive-review-2020-04-18.pdf

RESPONSES

[1] "what water take is to be offset (e.g. loss of surface flows, near surface groundwater, baseflow, and/or stored waters)"

The water take proposed to be offset for the Project is the permanent surface losses from the Metropolitan Special Area that may otherwise have reported to dams (e.g. Avon or Cordeaux Dams) and/or downstream take-off points (i.e. Pheasants Nest Weir) as a result of proposed longwall mining in Areas 5 and 6, notwithstanding that these losses are predicted to be negligible at the catchment scale.

This includes permanent diversion of surface water due to subsidence-related effects to watercourses from longwall mining, plus, losses from waterbodies (dams and watercourses) as a result of increased leakage due to depressurisation of the underlying groundwater system. These are referred to as Mechanism 2 and 3 losses, respectively, in the Submissions Report.

From a modelling perspective, this is both the:

- increased flux from the surface water system to the groundwater system; and
- decreased flux to the surface water system from the groundwater system.

South32's commitments in the EIS and Submissions Report address three separate issues in relation to predicted surface water losses, as summarised in Table 1, below.

Table 1: Summary of Impacts and Existing Commitments for Surface Water Losses due to the Project

Impact from Predicted Surface Water Losses	South32 Commitment	Details of how Commitment would be Achieved
1. Reduction in metropolitan water supply	1. Achieve "net gain" via: a) Direct offset – South32 implements works to result in net gain; and/or	• Direct offsets – treatment of mine water for use by Sydney Water and/or industrial users; and/or other users
	b) Indirect offset – South32 funds works to result in net gain (e.g. addressing pipe network losses)	• Indirect offsets – annual payment to the NSW Government based on agreed $/ML [refer below for details] of surface water loss (not already accounted for by direct offsets)
2. Loss of revenue to WaterNSW (as WaterNSW is not necessarily the beneficiary of either direct or indirect offsets)	2. Compensate WaterNSW for lost revenue as a result of surface water losses from the catchment	• Annual payment to WaterNSW based on $49.90/ML ("base") or $59.70/ML ("drought") (draft prices that IPART has determined WaterNSW can sell water to Councils – updated from the price as at the time of lodgement of the Project EIS to reflect draft updated IPART pricing)
3. Licencing of surface water losses under the *Water Management Act 2000*	3. South32 will hold appropriate licences under the *Water Management Act 2000*	• As per the 18 April media release, it is understood the NSW Government is currently establishing a licensing regime that would allow South32 to appropriately licence surface water losses

IPART = Independent Pricing and Regulatory Tribunal of NSW

[2] "whether groundwater take is to be offset, and if so, to what depth or strata"

With the exception of groundwater baseflow that may have otherwise reported to dams and watercourses in the Metropolitan Special Area (accounted for as part of Mechanism 3 surface water losses, as described above), groundwater losses to the mine workings would not be offset for the Project.

South32 holds sufficient licences under the *Water Sharing Plan for the Metropolitan Region Groundwater Sources 2011* to account for groundwater inflows to the mine workings for the Project (and the approved Dendrobium Mine). Accordingly, like any other water user in New South Wales (NSW), this take of groundwater (which does not affect metropolitan water supplies) will be appropriately licenced[2].

[3] "how water take is to be modelled, measured and/or monitored (which may vary according to the source of water)"

It is not possible to directly measure surface water losses resulting from longwall mining. Accordingly, the use of the Project groundwater model is required to quantify losses.

The following methodology is proposed to calculate annual surface water losses:

1. The NSW water year is based on 1 July to 30 June. The volume of surface water losses from the Project would be determined annually using the groundwater model after the end of each water year.
2. The volume of surface water lost would be calculated after the water year to allow the model to account for actual measurements of mine inflows, groundwater levels, stream flow and rainfall. In effect, this means the model would be re-calibrated with this data each year. The ability to use real data to inform and constrain the model during this re-calibration will improve the accuracy of the calculated surface water losses.
3. The monitoring locations providing data to inform and constrain the model would be specified in Extraction Plans over the life of the Project. This would include:
    - stream gauges to monitor stream flow above the mining area and downstream;
    - multi-level piezometers to measure changes in groundwater pressure/levels and provide site-specific information on the height of fracturing above the longwall panels;
    - Project-specific and regional meteorological monitoring to provide data on rainfall and evaporation rates; and
    - pumping rates from the underground workings to calculate mine inflow volumes.
4. If required, annual surface water losses calculated using the groundwater model would be validated via the use of a surface runoff model calibrated based on pre-mining conditions and compared to gauging data from reference catchments (i.e. nearby catchments unaffected by mining with similar characteristics, such as vegetation and catchment size).

[4] "what allowance should be made in respect of water quality impacts (e.g. arising from streambed cracking) and how this would be modelled, measured and/or monitored"

No material impacts to drinking water supplies are predicted as a result of localised impacts to water quality from streambed cracking. This conclusion is based on measurements from the existing mining operations in the catchment, including at the Dendrobium Mine and elsewhere and is supported by the findings of previous studies (refer to Section 9.3.6 of the EIS for further details).

It is noted the Independent Expert Panel for Mining in the Catchment's (IEP) Part 2 Report (2019)[3], which was released after lodgement of the EIS, concluded:

> *Although surface fracturing elevates metal loads in watercourses, there is no evidence that mining in the Special Areas is currently compromising the ability of WaterNSW to meet raw water supply agreement standards.*

Details of South32's water quality offset commitments to satisfy the 'Net Neutral or Beneficial Effects' (NorBE) test under the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* (Sydney Drinking Water Catchment SEPP) are outlined in Section 9.3.6 of the EIS and Section 6.7 of the Submissions Report.

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[2] South32 currently holds licences (9,530 ML) to account for the volume of predicted groundwater plus surface water that may ultimately be diverted from the surface to the mine workings. However, these licences are all held in the water sharing plan relevant to groundwater sources only. As outlined in the Minister's 18 April media release, the NSW Government intends to implement a "licensing regime to properly account for any water losses".

[3] Independent Expert Panel for Mining in the Catchment (2019). *Report of the Independent Expert Panel for Mining in the Catchment: Part 2 – Coal Mining Impacts in the Special Areas of the Greater Sydney Water Catchment*. Prepared for the NSW Department of Planning, Industry and Environment.

Fell (2014)[4] identifies that sedimentation is a parameter of concern to drinking water supplies. Similarly, the *Special Areas Strategic Plan of Management 2015* (WaterNSW and Office of Environment and Heritage [OEH], 2015[5]) identifies sedimentation as a key water quality risk to the Special Catchment Areas.

Therefore, although streambed cracking can result in localised increases in concentrations of metals (which have not been observed to compromise WaterNSW's ability to meet raw water standards), South32 proposes a number of additional water quality improvement actions as part of the Project that target sedimentation control.

The water quality improvement actions proposed by South32 are:

1. Transfer of 28.5 hectares (ha) of South32-owned land within the Metropolitan Special Area to WaterNSW, which would enable WaterNSW to manage and protect this land to maintain water quality values.
2. Direct implementation (by South32), or funding (to WaterNSW), of water quality improvement works, as outlined in Table 2.

The consent authority can be confident that the proposed water quality improvement actions would benefit water quality in the catchment, as the actions are based on (but additional to) the funding and works outlined in the *Special Areas Strategic Plan of Management 2015* (WaterNSW and OEH, 2015) to improve water quality.

Table 2: Proposed Water Quality Improvement Works

Water Quality Improvement Work	Estimated Financial Contribution (if works not conducted by South32)
Fire Management: • Slashing grass and vegetation for fire breaks (100 km and 200 ha). • Mulching trees and woodland along fire trails to maintain fire breaks (at least 22.5 km). • Conducting hazard reduction burns (at least 100 ha) in consultation with relevant authorities.	$371,500[a]
Inspect and Maintain Unsealed Road Network: • Inspect 150 km of unsealed roads. • Repair and upgrade 40 km of unsealed roads within the Special Catchment Areas.	$146,000[a]
Install and Maintain Appropriate Barriers and Fences: • Install barriers as required around any land transferred to WaterNSW. • Install barriers and fences to replace those that are damaged or vandalised.	$100,000[b]
Total	**$617,500**

Source: Table 9-3 of the EIS.

[a] Based on conducting an additional 50% of WaterNSW's Planned Activities for Fire Management and Unsealed Roads Program as per the *Catchment Protection Work Program 2018-19: Sydney Catchment Area*.

[b] Estimation only.

It is acknowledged that projects that target sedimentation control do not directly offset localised increases in metal concentrations. However, the Project would have a net neutral or beneficial effect on the surface water quality of the Special Catchment Area for the following reasons (Section 6.7 of the Submissions Report):

- The potential localised effects to surface water quality as a result of Project-related subsidence can themselves be considered environmentally neutral, given spikes in metal concentrations occur naturally (refer to Table 6-7A of the Submissions Report) in the catchment, and the lack of evidence that localised effects to date have resulted in adverse impacts to drinking water supplies.

- Water quality parameters that would potentially be impacted by Project-related subsidence (e.g. iron and manganese) are not identified as priority parameters when considering the potential impacts to the quality of drinking water supplies.

[4] Fell. C (2014). *Water Treatment and Sydney Catchment*. Discussion Paper for Office of NSW Chief Scientist and Engineer, May 2014.

[5] WaterNSW and Office of Environment and Heritage (2015). *Special Areas Strategic Plan of Management 2015*.

- By comparison, South32's proposed water quality improvement works target sedimentation, which is identified by Fell (2014) and WaterNSW and OEH (2015) as a priority surface water quality risk. Therefore, the implementation of the proposed water quality improvement works for the Project would result in an overall benefit to the water quality of drinking water supplies.

[5] "how the commitment would work in respect of rising and falling water take during the life of the project"

As described above (refer to comment 3), it is proposed that surface water losses would be quantified annually after each water year.

The amount of surface water to be offset would, therefore, match or exceed the annual volume quantified as being lost from the Metropolitan Special Area.

Direct Offsets

It is South32's preference to provide a "direct" offset. This would involve the treatment of mine water (that would otherwise be released via the licenced discharge point to seawaters off Port Kembla) to dam water quality and provide this treated water to users for beneficial use to offset existing demands on drinking water supplies.

The costs associated with establishment of the treatment facilities and associated pipelines are conservatively estimated to be $34M, and these costs would be borne by South32. Similarly, operating costs to treat water would be borne by South32.

Further detail regarding various direct offset options currently being prioritised for further investigation in consultation with DPIE, Sydney Water and WaterNSW are provided in the response to comment 8.

Records would be kept of the quantity of water treated each water year, and this volume of treated water would be compared to the calculated surface water loss (calculated as per the process described above in response to comment 3).

If water treatment facilities are established, there is no risk that there will be an insufficient quantity of mine water to treat and provide to users to offset surface water loss, as surface water represents a small (<30%) component of total mine inflows.

Indirect Offsets

It should be noted the ability for South32 to provide a direct offset is dependent on agreement from end users such as Sydney Water or BlueScope (i.e. is outside the control of South32). Similarly, South32 does not consider it would be possible for the consent authority to condition third parties to accept this water as part of any development consent for the Project.

If demand for treated mine water is less than predicted surface water losses (i.e. South32 is, for reasons outside its control, unable to directly offset surface water losses), then South32 would make a financial contribution to the NSW Government. This contribution would then be used by the Government to fund projects that "indirectly" provide for additional drinking water supplies or reduce losses to water supplies.

WaterNSW in its submissions to the Planning Assessment Commission process for the Russell Vale Underground Expansion Project stated[6]:

> *The current IPART approved value of Long Run Marginal Cost is in a range that includes the current Sydney Water retail price of $2.276 per kL or $2,276 per ML ($2015/16). IPART has set retail water prices to signal opportunity cost, and any resource decisions, either made by water consumers or by other parties such as miners, should be consistent with this value.*

The draft 2020-2021 Sydney Water retail price[7] is:

- $2.30/kL ("base scenario").
- $3.12/kL ("drought scenario" – which is triggered when dam levels are below 60% if the previous quarter was a "base scenario", or below 70% if the previous quarter was a "drought scenario").

[6] https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2015/10/russell-vale-colliery-underground-expansion-project--second-review/agency-submissions/waternswreferralresponsepdf.pdf

[7] Refer to Table 6-1 of IPART**:** https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-prices-for-sydney-water-corporation-from-1-july-2020/legislative-requirements-prices-for-sydney-water-corporation-from-1-july-2020/draft-report-review-of-prices-for-sydney-water-march-2020.pdf

If South32, for reasons outside its control, is unable to provide direct offsets for surface water losses, then funding to the NSW Government would be provided based on:

1. The calculated volume of surface water loss at the end of the water year (calculated as per the process outlined in the response to comment 3).
2. For any volume of calculated surface water loss not already accounted by direct offsets, funding to the NSW Government at the rate of $2.30/kL or $3.12/kL depending on whether "base scenarios" and/or "drought scenarios" has occurred for that water year.

The funding from any such indirect offsets could be used to address pipe network losses (or other relevant activities such as treating alternative sources of water) to achieve a net gain to drinking water supplies. For example, Sydney Water estimated pipe network losses increased from 41,610 ML to 47,268 ML between financial years 2016-17 and 2017-18 (i.e. an increase of 5,500 ML in a single year). By comparison the maximum predicted Project surface water loss is 1,935 ML/annum (refer to Figure 6-3L of the Submissions Report). As such, funding programs to address pipe network losses could result in benefits that far exceed predicted Project surface water losses, therefore resulting in "net gain".

In addition, the funding could be used to upgrade existing or new water treatment facilities (such as the Sydney Water Recycled Water Plant located in the Illawarra) to increase its capacity and therefore reduce reliance on raw dam water to result in "net gain".

[6] "how the commitment would work in respect of continuing water take following the life of the project"

Retirement of Licences

The NSW Aquifer Interference Policy acknowledges that large aquifer interference activities may result in ongoing water take, with a preference for the surrender of licence entitlements to account for such ongoing take:

> *Many large aquifer interference activities continue to take water from groundwater or connected surface waters well after the activity has ceased, eg open cut mining.*
>
> *The post-closure continued take of water until an aquifer system reaches equilibrium may extend from months to centuries after cessation, depending on the scale of the activity, recharge relationships and aquifer characteristics.*
>
> *Where there is ongoing take of water, the licence holder must retain a water licence for the period until the system returns to equilibrium or surrender it to the Minister.*
>
> *Accordingly, the trading of water that has been acquired to account for inflows during the life of the activity will be limited so that aquifer access licences and associated water accounts properly cater for the ongoing take of water after an aquifer interference activity has ceased.*
>
> *Given the likelihood of a less active mine management regime post-closure, surrendering of licence entitlements, that adequately cover any likely future low available water determination periods is preferable.*

Accordingly, existing groundwater licences held by South32 (purchased at a cost in excess of $6M) as well as any surface water licences held for the Project (i.e. following the establishment of such a licensing regime by the NSW Government) would be retired at the cessation of mining.

This would satisfy the preferred approach of the Aquifer Interference Policy.

Gifting of Direct Offset Infrastructure to Government

In addition to retiring licence entitlements, South32 would gift to the NSW Government any water treatment and piping infrastructure established for the Project (as above, the costs of establishing this infrastructure is conservatively estimated to be $34M).

This would allow the NSW Government to access and beneficially use the underground reservoir of water that would be available in the historic mine workings. This water is not subject to evaporation and as such could be treated and used during dry periods and/or provide an alternative to the use of reverse osmosis treated sea water (noting that the salinity of groundwater reporting to the mine workings will be significantly lower than sea water).

Alternative to Gifting of Direct Offset Infrastructure to Government – Post Mining Water Fund

As described above, for reasons outside South32's control, the water treatment facility may not be commissioned (i.e. if third parties do not accept treated mine water for beneficial use). Therefore, no facilities would have been commissioned to be gifted to the NSW Government post-mining (refer to the above).

If the $34M capital to establish the water treatment facilities is not spent during the life of the Project, then South32 would relinquish funds of $34M to the NSW Government at the end of the mine life. Using the same discount rate of 2.6%[8] as the NSW Government's Biodiversity Stewardship Agreement system, the Government could use the $34M contribution to provide in-perpetuity funding of $884,000 per annum.

[7] "whether and how the groundwater component of mine water can be used to offset surface water take"

As above, South32 already holds appropriate licences to account for groundwater take (i.e. inflows to mine workings). South32 is not aware of any restriction that would prevent treatment of this licensed mine water and provision to other users as a direct offset to achieve a net gain for drinking water supplies.

[8] You are also requested to provide additional details regarding potential beneficial uses of mine water or other offsetting measures currently under consideration, together with indicative timetables as to when these initiatives may be able to be implemented

Various direct offset initiatives have been discussed with key stakeholders (e.g. DPIE, WaterNSW and Sydney Water).

Options currently being prioritised for further investigation are those provided in Table 3 and shown on Figures 1 to 3.

Key actions currently being undertaken by South32 and Government include:

- Sampling of groundwater currently reporting to the Dendrobium Mine workings to confirm its quality characteristics.
- Further confirmation of existing supply and demands for water from the Sydney Water Recycled Water Plant.
- Prioritisation of various options.

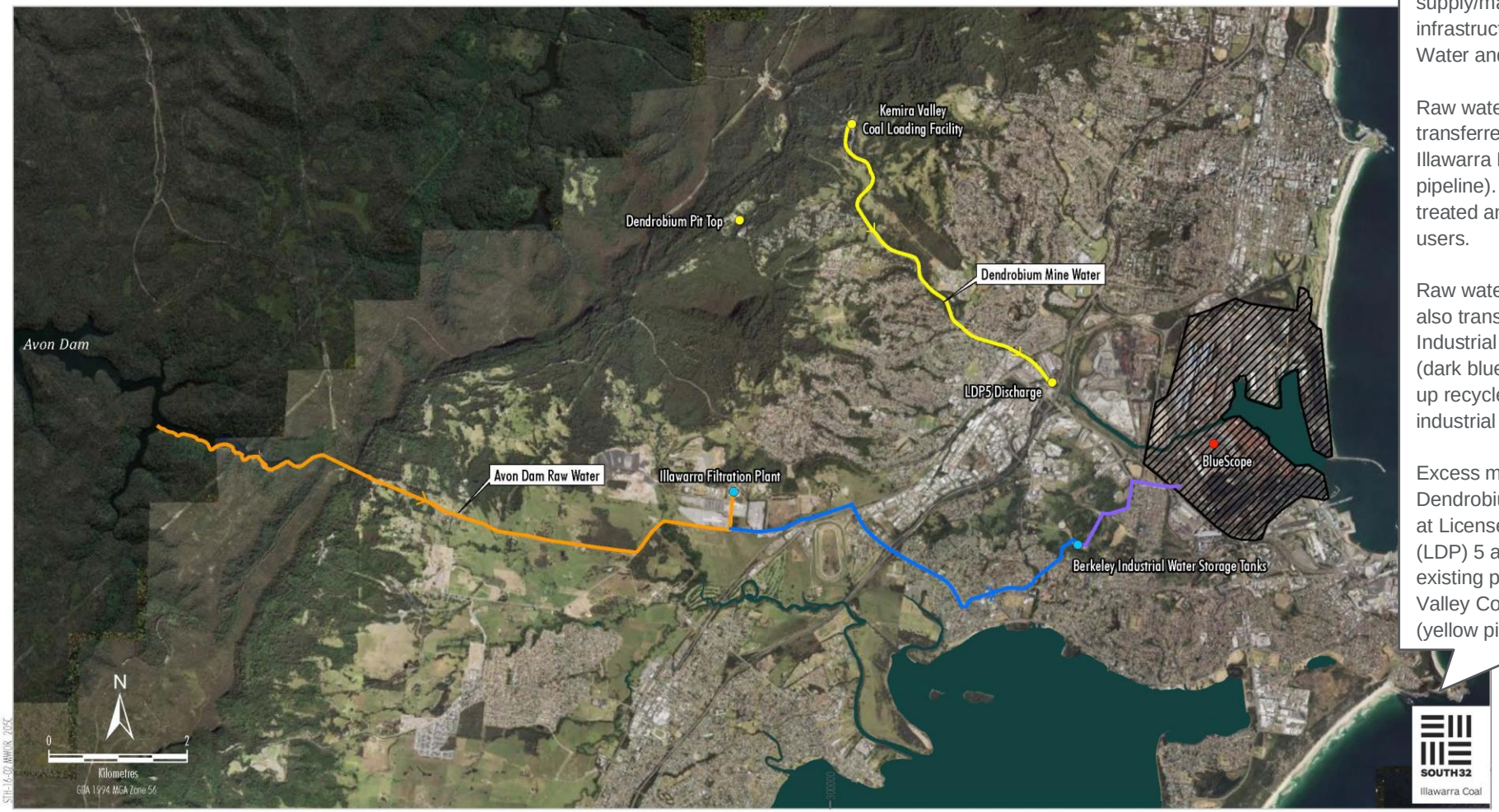
Subject to approval of the Project, South32 expects any of the direct offset options below could be expected to be operational within approximately 24-36 months (and therefore likely commissioned prior to the commencement of secondary extraction and associated surface water losses due to the Project).

However, as noted above, the timing will ultimately be dependent on third parties and is, therefore, outside South32's control.

Table 3: Direct Offset Options Prioritised for further investigation with Government

Option	Key Stakeholders	Potential Re-Use Water Volume/Direct offset
1. Transfer to Illawarra Filtration Plant to supplement raw water supply for potable water and/or for supply to industrial users	Sydney Water BlueScope Steel or other industrial users	> 5 ML/d for supply to the Illawarra Filtration Plant. BlueScope's average water demand is approximately 20 ML/day. However, the Sydney Water Recycled Water Plant was recently upgraded and is supplying all of this requirement except approximately 1 ML/day. Any volume of water transferred for beneficial use would be a direct offset for raw water currently piped from Avon Dam.
2. Transfer to industrial water supply – Berkeley Industrial Water Storage Tanks		BlueScope's average water demand is approximately 20 ML/day. However, the Sydney Water Recycled Water Plant was recently upgraded and is supplying all of this requirement except approximately 1 ML/day. Any volume of water transferred for beneficial use would be a direct offset for raw water currently piped from Avon Dam.

[8] https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/total-fund-deposit-discount-rate



Source: © Department of Customer Service 2020

DENDROBIUM MINE

Existing Water Supply Infrastructure

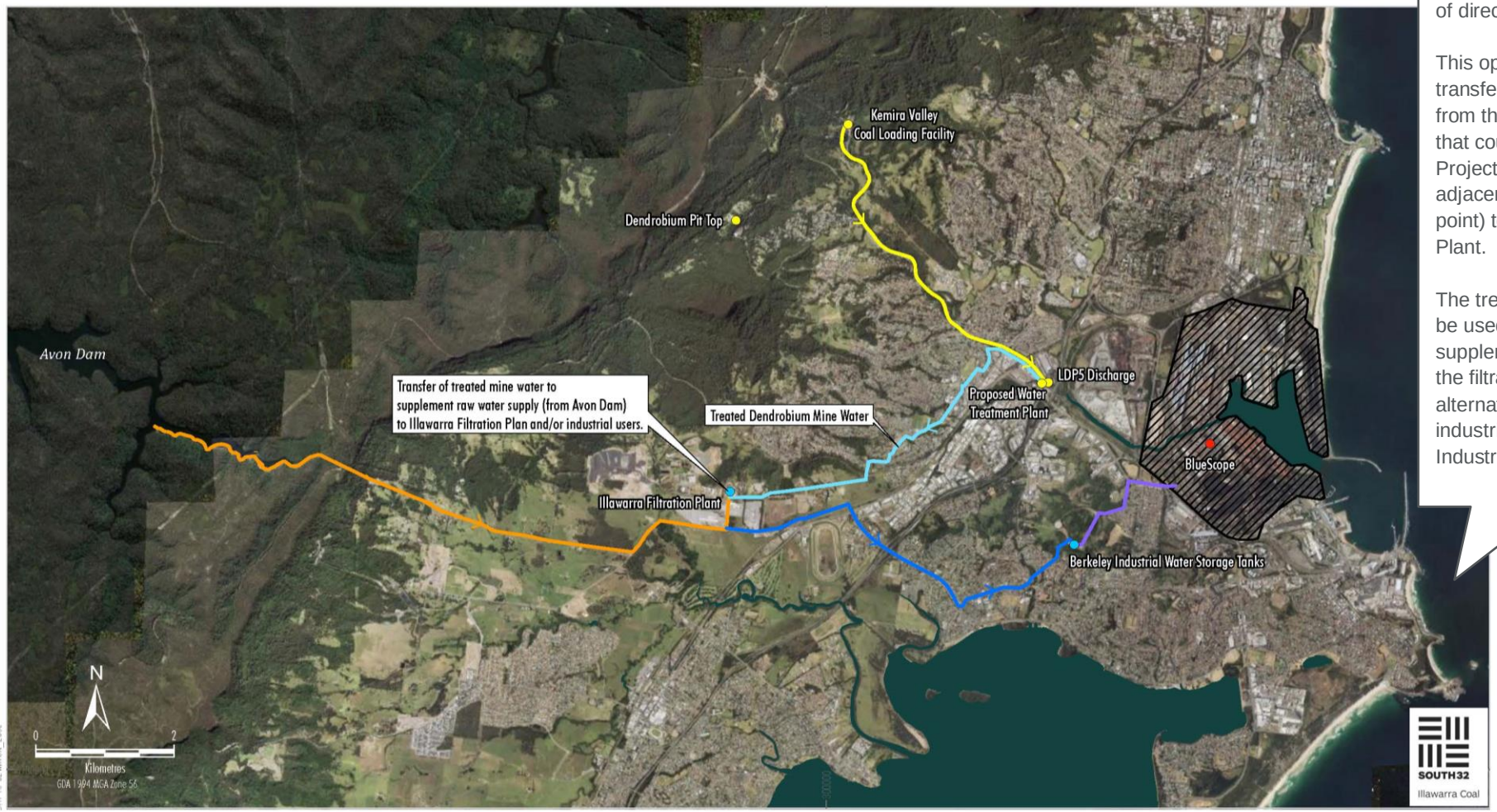
Figure 1

This figure shows the indicative location of existing water supply/management infrastructure owned by Sydney Water and South32.

Raw water from the Avon Dam is transferred via pipeline to the Illawarra Filtration Plant (orange pipeline). This water is then treated and distributed to end users.

Raw water from Avon Dam is also transferred to the Berkeley Industrial Water Storage Tanks (dark blue pipeline) where it tops up recycled water supply to industrial users (purple pipeline)

Excess mine water from the Dendrobium Mine is discharged at Licensed Discharge Point (LDP) 5 at Allans Creek via the existing pipeline from the Kemira Valley Coal Loading Facility (yellow pipeline).



LEGEND
- BlueScope
- South 32
- Sydney Water Supply Points
- Avon Dam Raw Water to Illawarra Filtration Plant
- Avon Dam Raw Water to Berkeley Industrial Water Storage Tanks
- Industrial Water (Recycled Water topped up with Avon Dam Raw Water) to Industrial Users
- Existing Kemira Valley Discharge Alignment
- Potential Option 1 Pipeline Alignment*

** Pipeline alignment is indicative, and would be subject to detailed design and separate approval.**

Source: © Department of Customer Service 2020

DENDROBIUM MINE

Option 1 -
Transfer of Treated Water to Illawarra Filtration Plant and/or Industrial Users

Figure 2

This figure shows a schematic of direct offset Option 1.

This option would involve the transfer of treated mine water from the water treatment facility that could be built for the Project (proposed to be located adjacent to the LDP5 discharge point) to the Illawarra Filtration Plant.

The treated water could either be used by Sydney Water to supplement raw water supply to the filtration plant, or alternatively supply water to industrial users via the Berkeley Industrial Water Storage Tanks.

This figure shows a schematic of direct offset Option 2.

This option would involve the transfer of treated mine water from the water treatment facility that could be built for the Project (proposed to be located adjacent to the LDP5 discharge point) to the Berkeley Industrial Water Storage Tanks.

The treated water could supplement the existing supply of recycled/raw water to industrial users (e.g. BlueScope).

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LEGEND
- BlueScope
- South 32
- Sydney Water Supply Points
- Avon Dam Raw Water to Illawarra Filtration Plant
- Avon Dam Raw Water to Berkeley Industrial Water Storage Tanks
- Industrial Water (Recycled Water topped up with Avon Dam Raw Water) to Industrial Users
- Existing Kemira Valley Discharge Alignment
- Potential Option 2 Pipeline Alignment*

* Pipeline alignment is indicative, and would be subject to detailed design and separate approval."

Source: © Department of Customer Service 2020

DENDROBIUM MINE

Option 2 - Transfer of Treated Water to Berkeley Water Tanks for Industrial Users

Figure 3