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MEMORANDUM

Date	5 February 2025	**Title**	GEHBI Targeted Flora Survey
Ref.	MRWA24001_MEM_Rev2	**Distribution**	Clare Collett – Main Roads WA
Author/s	Lisa Chappell Associate Botanist/Environmental Scientist	**Review/ Authorisation**	John Braid Principal Environmental Consultant Kellie Bauer-Simpson Principal Ecologist

1 BACKGROUND

Main Roads Western Australia (Main Roads) is currently seeking to obtain environmental approvals for the Great Eastern Highway Bypass Interchanges (GEHBI) project. The GEHBI project area was surveyed by Biota in 2019/2020. Given the time since the initial survey, and the findings of the GEHBI Biological Survey Desktop Assessment and Gap Analysis (FVC 2024), the Department of Water and Environmental Regulation (DWER) have requested that Main Roads undertake an additional targeted spring flora survey to inform the Native Vegetation Clearing Permit assessment for the GEHBI project (CPS 9448).

DWER requested that Main Roads undertake a targeted survey of suitable habitat for the following species to inform the NVCP assessment:

- *Levenhookia preissii* (Priority 1)
- *Bolboschoenus fluviatilis* (Priority 1)
- *Schoenus benthamii* (Priority 3)
- *Conospermum undulatum* (Threatened Flora – Vulnerable).

The targeted search for *Levenhookia preissii* (Priority 1), *Bolboschoenus fluviatilis* (Priority 1) and *Schoenus benthamii* (Priority 3) was conducted within the 2.623 ha of riparian vegetation associated with Helena River, as described in Biota (2021) and spatially presented in **Figure 1**.

The targeted search for *Conospermum undulatum* was conducted within an area of 2.783 ha of suitable habitat for the species, along the eastern side of Roe Highway from Helena River to approximately 700 m north of Kalamunda Road (**Figure 1**).

0 150 300 450 600 m

GDA2020 MGA Zone 50

Figure 1 - Survey Area

Legend

Survey Area:

- Helena River riparian vegetation
- Potential *Conospermum undulatum* habitat
- Roads
- Drainage

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2 SCOPE OF WORK

The required surveys included:

- Targeted conservation significant flora survey within a 2.623 ha area of Helena River riparian vegetation (**Figure 1**):
    - *Bolboschoenus fluviatilis* (Priority 1)
    - *Levenhookia preissii* (Priority 1)
    - *Schoenus benthamii* (Priority 3)
- Targeted conservation significant flora survey for *Conospermum undulatum* (Vulnerable) within 2.783 ha of potential habitat (**Figure 1**)
- Provision of spatial data in accordance with Main Roads data standards.

3 METHODOLOGY

3.1 TARGETED SURVEY

The targeted survey for *Conospermum undulatum* (Vulnerable), *Levenhookia preissii* (Priority 1), *Bolboschoenus fluviatilis* (Priority 1) and *Schoenus benthamii* (Priority 3) was conducted by Taryn Brebner (Botanist/Ecologist, Flora Collection Licence FB62000156-2) and Olga Nazarova (Botanist, Flora Collection Licence FB62000596; Threatened Flora Collection Licence TFL 2324-0021) on 15 October 2024 and further for only *Conospermum undulatum,* by Lisa Chappell (Associate Botanist Flora Collection Licence FB62000532) and John Braid (Principal Environmental Consultant) on 4 December 2024.

Searches for conservation significant flora were conducted via parallel foot traverses, suitably spaced depending on the visibility within the vegetation. All traverses were GPS tracked by electronic devices (tablets) to record track logs and enable shapefiles to be presented showing survey extents and effort within the proposal area (**Figure 2** series).

Where individual or suspected targeted flora species are observed, the location of each potentially significant taxon collected was recorded using a GPS enabled device with an accuracy of less than 5 m. Where populations were identified, the extent of populations was to be mapped and surveyed to determine number of individuals and habitat area for each population. Where a population of conservation significant flora was found to extend outside the survey area, the extent of the population beyond the boundary of the survey area was to be defined, including the local abundance, landform and associated flora species (where access permitted). In order to determine the size and extent of significant flora populations, detailed counts were to be undertaken except where populations are large or widespread, in which case the population was to be estimated using methods consistent with the Threatened and Priority Flora Report Form – Field Manual (DBCA 2017).

Where (if) Threatened or Priority flora (or flora suspected to be) were observed, the following additional data was to be recorded:

- GPS location of each individual plant allowing an inventory of the number of plants/population size
- vegetation type and condition at the recorded location
- condition of plants/populations recorded.

Completed forms (if any) were to be submitted to DBCA, which is a requirement of all flora collecting permits. Copies of submission forms are also provided to Main Roads upon submission to DBCA.

The timing of the field assessment (October) was considered optimal to identify flowering individuals of the listed conservation-significant flora species, based on documented typical flowering times of the target flora.

Figure 2.a - Survey Effort

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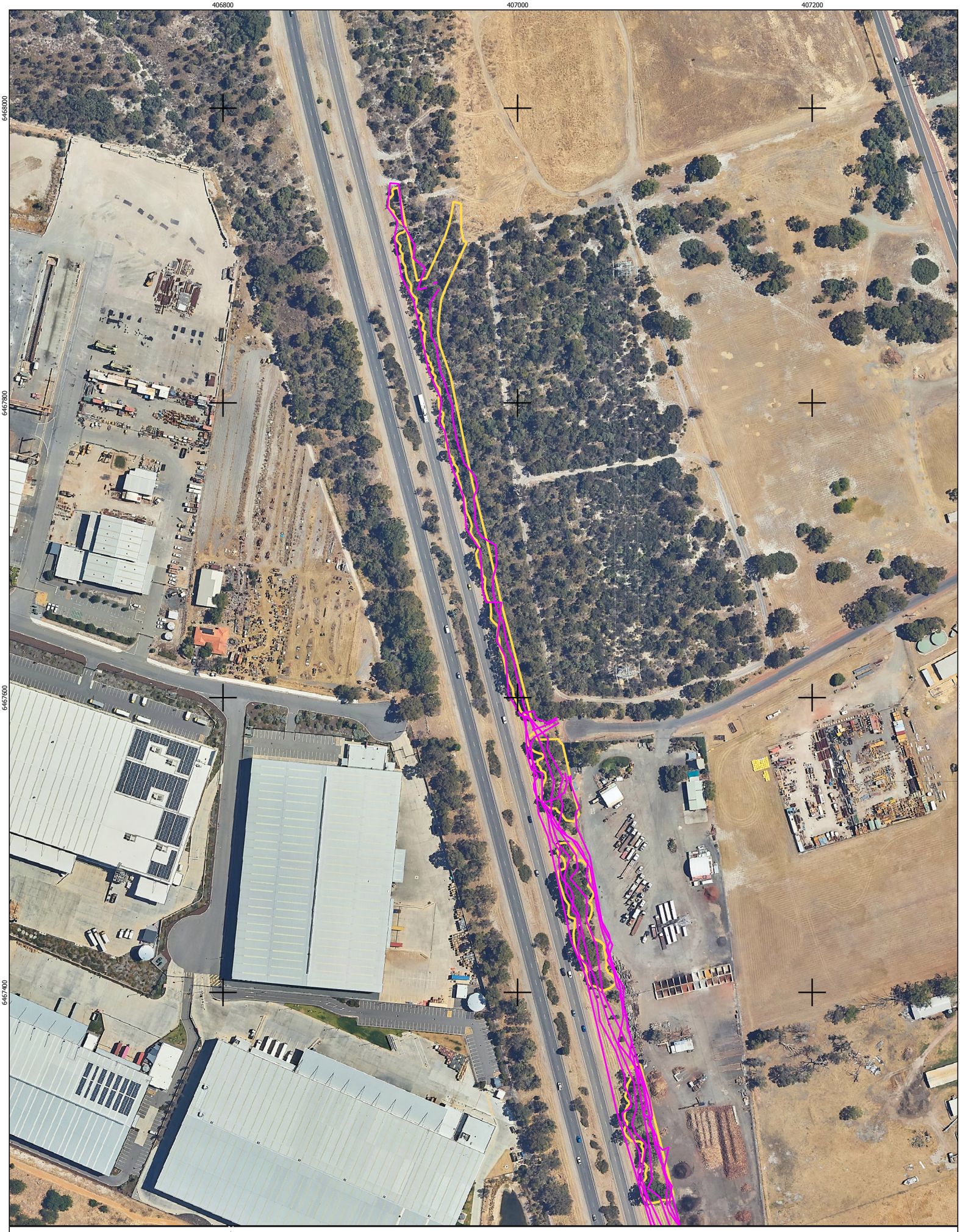

Figure 2.b - Survey Effort

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Figure 2.c - Survey Effort

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Figure 2.d - Survey Effort

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3.2 SURVEY LIMITATIONS

The current assessment was assessed against limitations imposed by many variables, as outlined in the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) (**Table 1**).

Table 1 – Potential Survey Limitations and Constraints

Aspect	Constraint?	Commentary
Availability of regional data, previously available information	No	The survey area occurs in the Swan Coastal Plain IBRA region. Various flora and vegetation surveys have been conducted within the vicinity of survey, including one conducted within the survey area by Biota (2021) for the GEHBI project. This available information provides a good basis for understanding the extent of suitable habitats for target species for inclusion in the survey.
Scope (detail)	No	The scope of work was limited to targeting potentially occurring Threatened and Priority flora, which is considered suitable given the previous flora and vegetation surveys conducted only three years prior.
Competency/ experience of personnel	No	The personnel leading the field assessment, and undertaking flora identifications and reporting are experienced ecologists and botanists, with specialist skills in their respective fields. The lead survey Botanist, Taryn Brebner, has more than seven years' experience in undertaking biological surveys in Western Australia, and Olga Nazarova is a specialist taxonomist, with advanced floral recognition skills and experience in the identification of flora of the Swan Coastal Plain.
Survey effort/detail/ intensity	No	Four conservation significant species were targeted during the assessment. Of these, *Conospermum undulatum* was previously recorded within the GEHBI project area (Biota 2021). The entire survey area was traversed on foot by two botanists, suitably spaced depending on the visibility within the vegetation. *Levenhookia preissii* (Priority 1), *Bolboschoenus fluviatilis* (Priority 1) and *Schoenus benthamii* (Priority 3) were not recorded within the survey area by Biota (2021). The entire survey area was traversed on foot and therefore, it is considered that the level of survey effort, detail and intensity was adequate.
Seasonal timing and climatic conditions	No	The flora field survey was conducted in October, which was considered optimal to identify flowering individuals of targeted flora. *Conospermum undulatum* is documented to flower between May-October and is well-recognised by leaf morphology. *Levenhookia preissii* flowers between September and December or January, *Bolboschoenus fluviatilis* during spring to summer and June (Provincial 2019) and *Schoenus benthamii* between October and November (WA Herb 1998-). *Conospermum undulatum* were recorded within the survey area during December 2024. These occurrences were still in flower and therefore, the seasonal timing of the survey is, not considered to have been a limitation of the survey.
Access	No	The majority of the survey area was readily accessible, and was traversed on foot. Only a small portion of the riparian vegetation was inaccessible due to water inundation. Due to the inundation, it is considered very unlikely that any of the targeted flora would occur in these small areas.
Disturbances	No	The survey area occurs directly adjacent to Roe Highway and areas cleared for industry and other infrastructure. The majority of the survey area was defined by Biota (2021) to be in 'Excellent to Very Good' condition. Regardless of the condition of the vegetation, the disturbances are not considered to have been a limitation for the targeted survey.
Survey completeness	No	The survey was completed to a high level of detail. All areas were accessible via foot traverses, other than a small portion of riparian vegetation that was inundated at the time.

4 RESULTS AND DISCUSSION

None of the targeted Priority flora, *Bolboschoenus fluviatilis* (Priority 1), *Levenhookia preissii* (Priority 1) or *Schoenus benthamii* (Priority 3), were recorded during the survey, despite extensive ground traverses. Search traverses are presented in **Figure 2**.

The targeted survey was conducted during October which was considered optimal to conduct targeted searches for all targeted species. *Conospermum undulatum, Levenhookia preissii* and *Schoenus benthamii,* all typically flower during October (WA Herb 1998-). Limited flowering information is available for *Bolboschoenus fluviatilis,* however it has been documented to flower during spring to summer (Plantnet 2024).

Conospermum undulatum is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Biodiversity Conservation Act 2016* (BC Act). It is a geographically restricted species spanning a distance of approximately 20 km, between Hazelmere and Gosnells (WA Herb 1998-). *Conospermum undulatum* was previously recorded within the current survey area, from four locations, consisting of three DBCA records from 2001 and 2009 (DBCA 2024a, 2024b) and one Biota record (2021) (**Figure 3**). These records were not relocated by FVC during the current survey, despite extensive traverses in close proximity to these recent records (**Figure 4**). The locations of one of the DBCA occurrences (recorded in 2009) and the Biota record, are within areas that have been subject to recent disturbance, which may have occurred after these individuals were originally recorded. The remaining DBCA records occur in areas of heavy weed infestation and isolated *Jacksonia floribunda*.

Five *Conospermum undulatum* individuals were recorded within the survey area in December 2024 (**Figure 4**, **Plate 1**). Two of these (one adult and, one juvenile) occur approximately 6.5 m from the recorded Biota location. The remaining three individuals were recorded in locations where this species has not been previously recorded, and are considered to be new occurrences. Whilst, this survey was conducted outside of spring, the recorded individuals were still in flower and, therefore, timing is not considered to be a limitation of the survey. Threatened flora report forms are presented in **Appendix A**.

Plate 1 – Recorded *Conospermum undulatum*

Plate 2 – Flowering *Conospermum undulatum*

Bolboschoenus fluviatilis (Priority 1), *Levenhookia preissii* (Priority 1) and *Schoenus benthamii* were not recorded within the wider GEHBI project area during the Biota survey in 2019/2020.

Bolboschoenus fluviatilis is a poorly known species and is classed as a perennial sedge (WA Herb 1998-). This species typically occurs along watercourses associated with *Eucalyptus rudis* Woodlands along the banks of the Swan or Canning Rivers. The closest known occurrence is approximately 5.5 km west of the survey area.

Levenhookia preissii is an ephemeral annual, is endemic to south-west of Western Australia and grows in grey or black sandy peat soils in swampy areas (WA Herb 1998-). It is distributed between Nambung Station in the north, to Augusta in the south. The closest known occurrence is approximately 3.9 km west of the survey area from a historic record collected in 1954.

Schoenus benthamii typically occurs in white, grey sand, sandy clay, winter wet flats or swamps (WA Herb 1998-). It is distributed between Mogumber and Denmark. The closest known occurrence is 6.6 km south-west of the riparian vegetation of the survey area.

Whilst riparian vegetation occurs in the survey area associated with the Helena River, this extent is predominantly degraded, with a high proportion and abundance of weeds and therefore, is not considered suitable habitat for *Bolboschoenus fluviatilis, Levenhookia preissii* or *Schoenus benthamii*. In some locations, the vegetation lacks any intact understorey layer, with vegetation comprising of overstorey species over weeds and introduced grasses. The riparian vegetation was extensively searched and none of the target species were observed. Due to the high abundance of introduced grasses, *Bolboschoenus fluviatilis, Levenhookia preissii* and *Schoenus benthamii* are all considered unlikely to occur within the survey area.

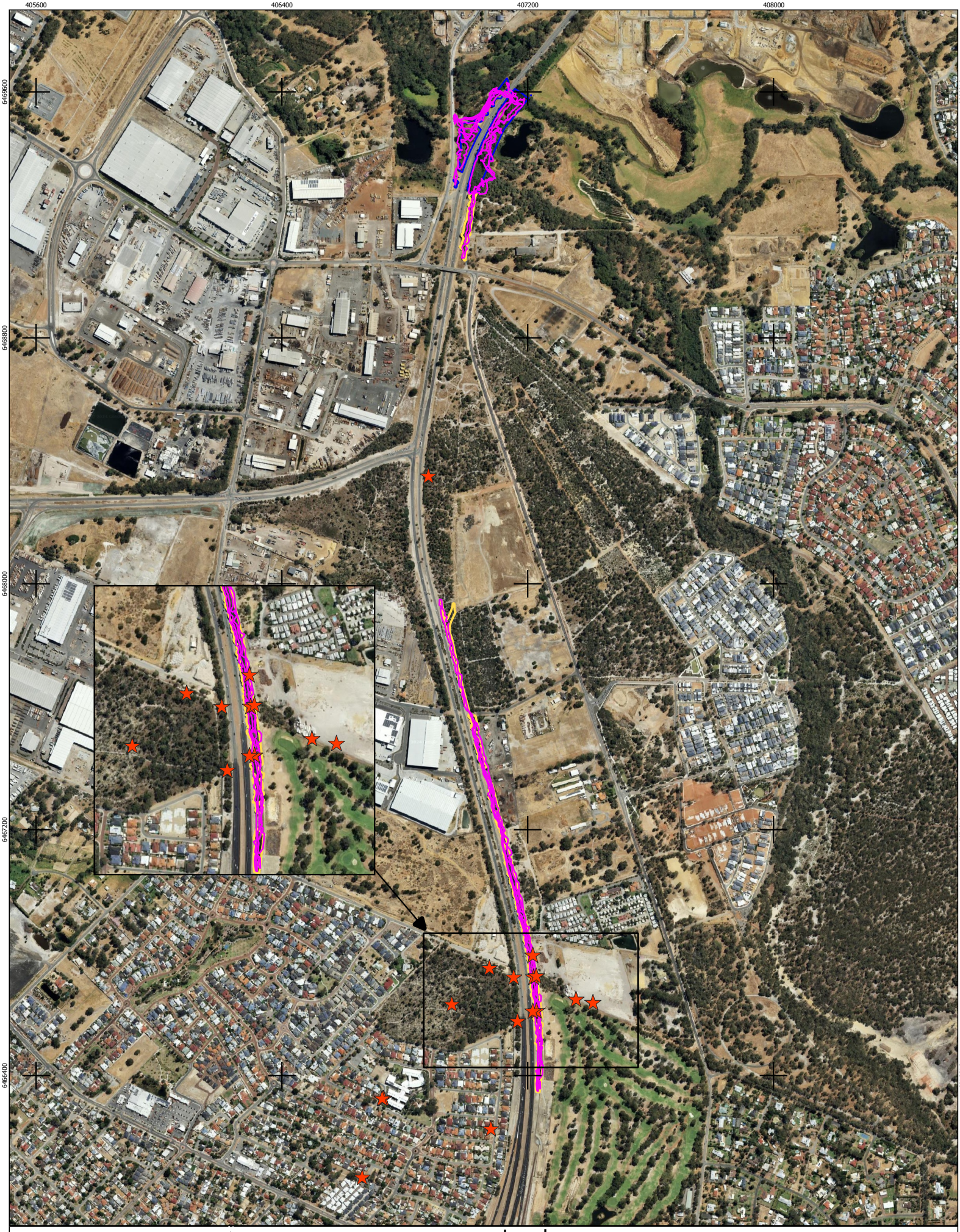

Figure 3 - Previously Recorded *Conosperumum undulatum*

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Figure 4 - *Conospermum undulatum* within the Survey Area

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5 CLOSING

Should you require further information or clarification regarding the information provided in this report, please do not hesitate to contact the undersigned.

Best regards,

Kellie Bauer-Simpson
Managing Director
Principal Ecologist/Environmental Manager

6 REFERENCES

Biota Environmental Services (Biota) (2021) *Great Eastern Highway Interchanges (Roe Highway and Abernethy Road) Biological Survey*. Unpublished report prepared for Main Roads WA.

Department of Biodiversity, Conservation and Attractions (DBCA) (2024a) *TPFL Database Search*. Provided by Main Roads WA

Department of Biodiversity, Conservation and Attractions (DBCA) (2024b) *WA Herbarium Database Search.* Provided by Main Roads WA

Department of Environment and Conservation (2009) Waxy-leaved smokebush (*Conospermum undulatum*) Recovery Plan. Commonwealth Department of the Environment, Water, Heritage and the Arts, Canberra.

Department of Biodiversity Conservation and Attractions (DBCA) (2017) *Threatened and Priority Flora Report Form – Field Manual.* Version 1.3.

PlantNET (The NSW Plant Information Network System) (2024) *Royal Botanic Gardens and Domain Trust, Sydney*. https://plantnet.rbgsyd.nsw.gov.au (Accessed 29 October 2024).

Provincial Plants and Landscapes (Provincial) (2019) *Bolboschoenus fluviatilis*. https://plantsandlandscapes.com.au/plant/bolboshonenus-fluviatilus/ (Accessed 14 October 2024).

Western Australian Herbarium (WA Herb) (1998-) *Florabase – the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. https://florabase.dbca.wa.gov.au/ (Accessed 14 October 2024).

APPENDIX A – THREATENED FLORA REPORT FORMS

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants

TAXON: *Conospermum undulatum* **TPFL Pop. No:**

OBSERVATION DATE: 04/12/2024 **CONSERVATION STATUS:** T **New population** ☐

OBSERVER/S: Lisa Chappell & John Braid **PHONE**

ROLE: Associate Botanist/Environmental Scientist **ORGANISATION:** Focused Vision Consulting

EMAIL: projects@focusedvision.com.au

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

C. 1.1 km N of the intersection of Roe Hwy & Kalamunda Rd, on the E side of of Roe Hwy.

Reserve No:

DBCA DISTRICT: **LGA:** City of Kalamunda Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☐
Lat / Northing: -31.93170577
Long / Easting: 116.01844081
ZONE:

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: ____ Map used: _____
Boundary polygon captured: ☐ Map scale: _____

LAND TENURE:

Nature reserve ☐	Timber reserve ☐	Private property ☐	Rail reserve ☐	Shire road reserve ☐
National park ☐	State forest ☐	Pastoral lease ☐	MRWA road reserve ☐	Other Crown reserve ☐
Conservation park ☐	Water reserve ☐	UCL ☐	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☐ Count method: _____
(Refer to field manual for list)

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	**Mature:**	**Juveniles:**	**Seedlings:**	**Totals:**
Alive	4	1		5
Dead				

Area of pop (m²): 530

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. ____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☒
Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: 100%

CONDITION OF PLANTS: Healthy ☐ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
• Road infrastructure (within Great Eastern Hwy bypass interchange development envelope)	L	H	H
•			
•			

Please return completed form to **Species And Communities Program** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Program.

Record entered by:_____ **Sheet No.:**_____ **Record Entered in Database** ❑

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Threatened and Priority Flora Report Form

Version 1.4 March 2021

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☐
Ridge ☐
Outcrop ☐
Slope ☐
Flat ☒
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☐
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other: _____

LOOSE ROCK:
(on soil surface; eg gravel, quartz fields)
0-10% ☐
10-30% ☐
30-50% ☐
50-100% ☐

SOIL TYPE:
Sand ☒
Sandy loam ☐
Loam ☐
Clay loam ☐
Light clay ☐
Peat ☐
Specify other: _____

SOIL COLOUR:
Red ☐
Brown ☐
Yellow ☐
White ☒
Grey ☒
Black ☐
Specify other: _____

DRAINAGE:
Well drained ☐
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) ; **3**. Isolated clumps of sedges (M.tetragona)

1. Allocasuarina fraseriana, *Eucalyptus marginata and Banksia menziesii* open woodland
2. *Adenanthos cygnorum, Jacksonia floribunda, Xanthorrhoea preissii* open shrubland
3. *Mesomelaena* sp. & *Avena barbata* sedge/grassland
4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

FLORA AUTHORISATION / LICENCE No: FB62000532 Note if only observing plants (i.e. no specimens or plant matieral is taken) then no authorisation/licence is required. For further information on authorisation and licening requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: nc WA Herb. ☐ Regional Herb. ☐ District Herb. ☐ Other: _____

LODGEMENT: WA Herb Lodgement No: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☒ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: O. Nazarova Role: Botanist Signed: on Date: 04/02/2025

Please return completed form to **Species And Communities Program** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Program.

Record entered by:_____ **Sheet No.:**_____ **Record Entered in Database** ❑