

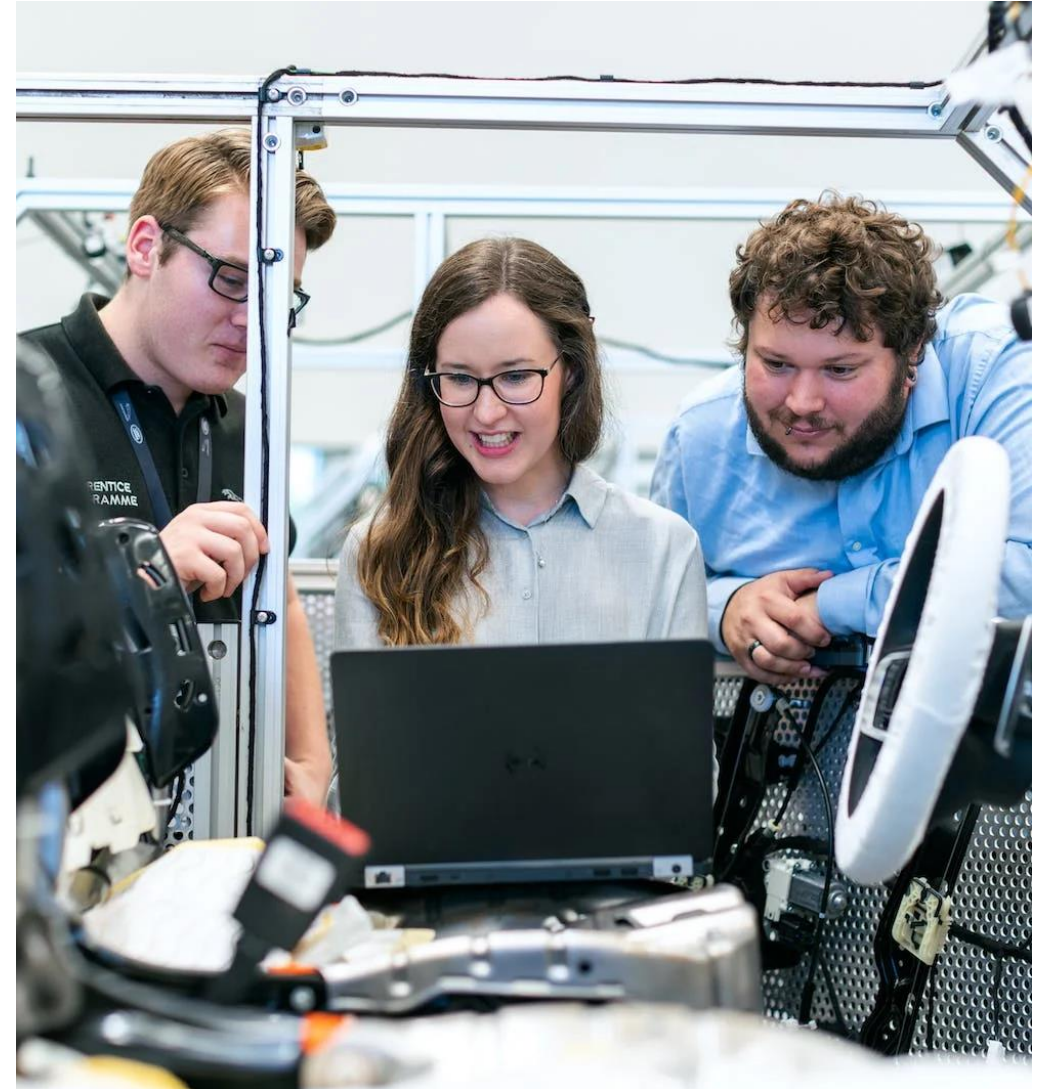
2023 Swinburne  
Career Practitioner Seminar

# Engineering

From study to success with  
hands-on industry experience.

**Presented by**  
Jenny Turner, Olivia Salamone and Nathan Hadfield

17<sup>th</sup> February 2023 | AMDC505



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# Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture, and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.

We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures, and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.

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# Today's Presenters

**Jennifer Turner**

Engineer in Residence

**Olivia Salamone**

Final-year engineering student

**Nathan Hadfield**

Industry partner

**knox**  
your city



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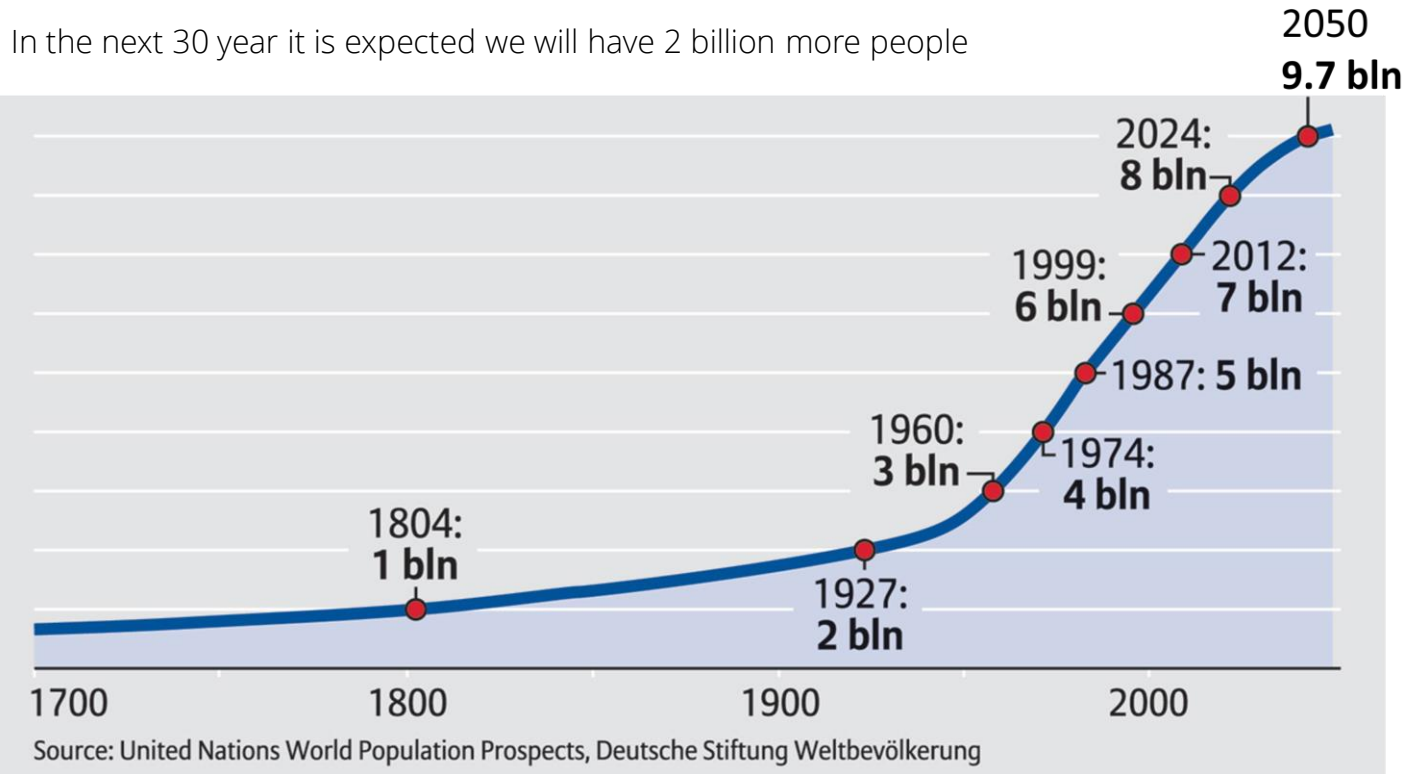
# Why Engineering?

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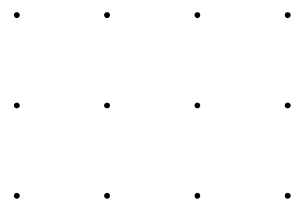
# World population growth

In the next 30 year it is expected we will have 2 billion more people



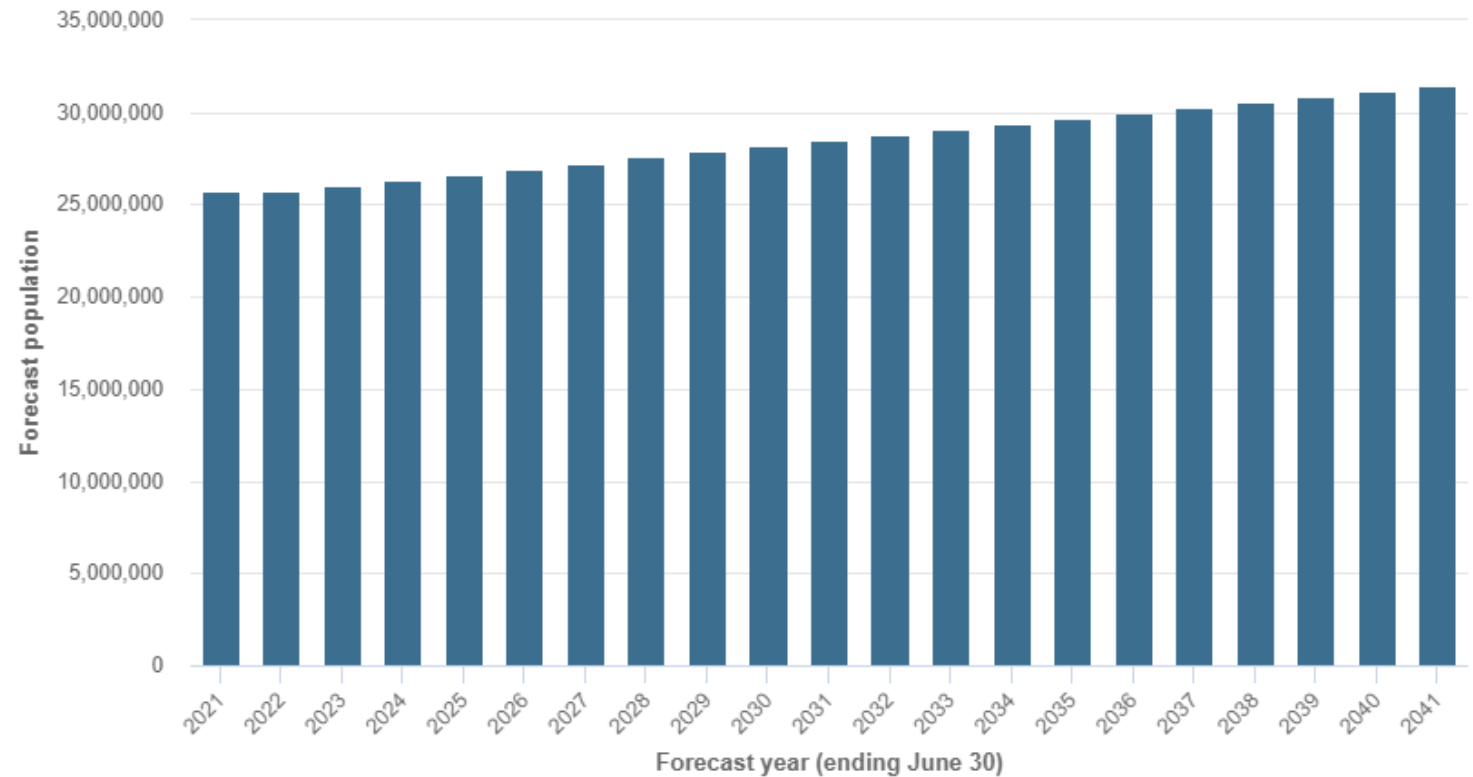
# Australian population growth

Over next 20 years



## Forecast population

Australia



22%

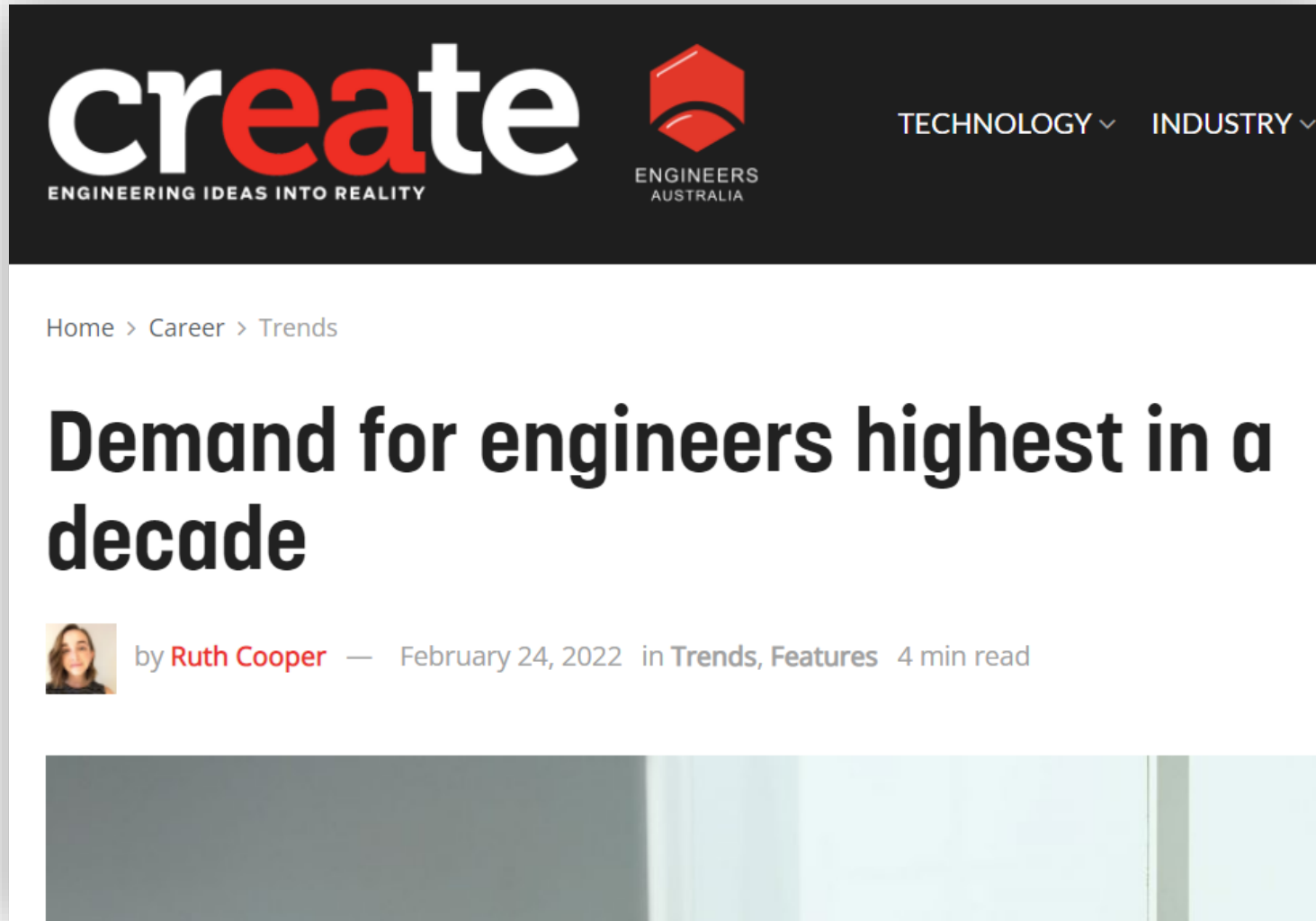
increase across Australia

26%

increase in Victoria,  
the largest state-wide growth

Source: .id SAFi National to State tops-down forecast, 4.3.1, published May 2021. Prepared by .id (informed decisions)

# Current demand for engineers in Australia



The screenshot shows the top of a web page from 'create ENGINEERING IDEAS INTO REALITY'. It features the 'ENGINEERS AUSTRALIA' logo and navigation links for 'TECHNOLOGY' and 'INDUSTRY'. The breadcrumb trail is 'Home > Career > Trends'. The main headline is 'Demand for engineers highest in a decade'. Below the headline, it says 'by Ruth Cooper — February 24, 2022 in Trends, Features 4 min read'. The bottom of the screenshot shows a blurred image of a modern building interior.

**create**  
ENGINEERING IDEAS INTO REALITY

**ENGINEERS AUSTRALIA**

TECHNOLOGY ▾ INDUSTRY ▾

Home > Career > Trends

## Demand for engineers highest in a decade

by **Ruth Cooper** — February 24, 2022 in Trends, Features 4 min read



# Current and future demand for engineers

According to the Australian Government National Skills Commission:  
**“the shortage of professional engineers may become more acute”**

The NSC lists the following engineering disciplines as being in current shortage, with the prediction of strong future demand to 2025.

<b>Schedule 1</b>	Aircraft Maintenance Engineer <i>(Avionics, Mechanical &amp; Structures)</i>
<b>Schedule 2</b>	Civil Engineer
<b>Schedule 3</b>	Electrical Engineer
<b>Schedule 4</b>	Geotechnical Engineer
<b>Schedule 5</b>	Mechanical Engineer

<b>Schedule 6</b>	Mining Engineer <i>(excluding Petroleum)</i>
<b>Schedule 7</b>	Petroleum Engineer
<b>Schedule 8</b>	Software Engineer
<b>Schedule 9</b>	Structural Engineer
<b>Schedule 10</b>	Transport Engineer

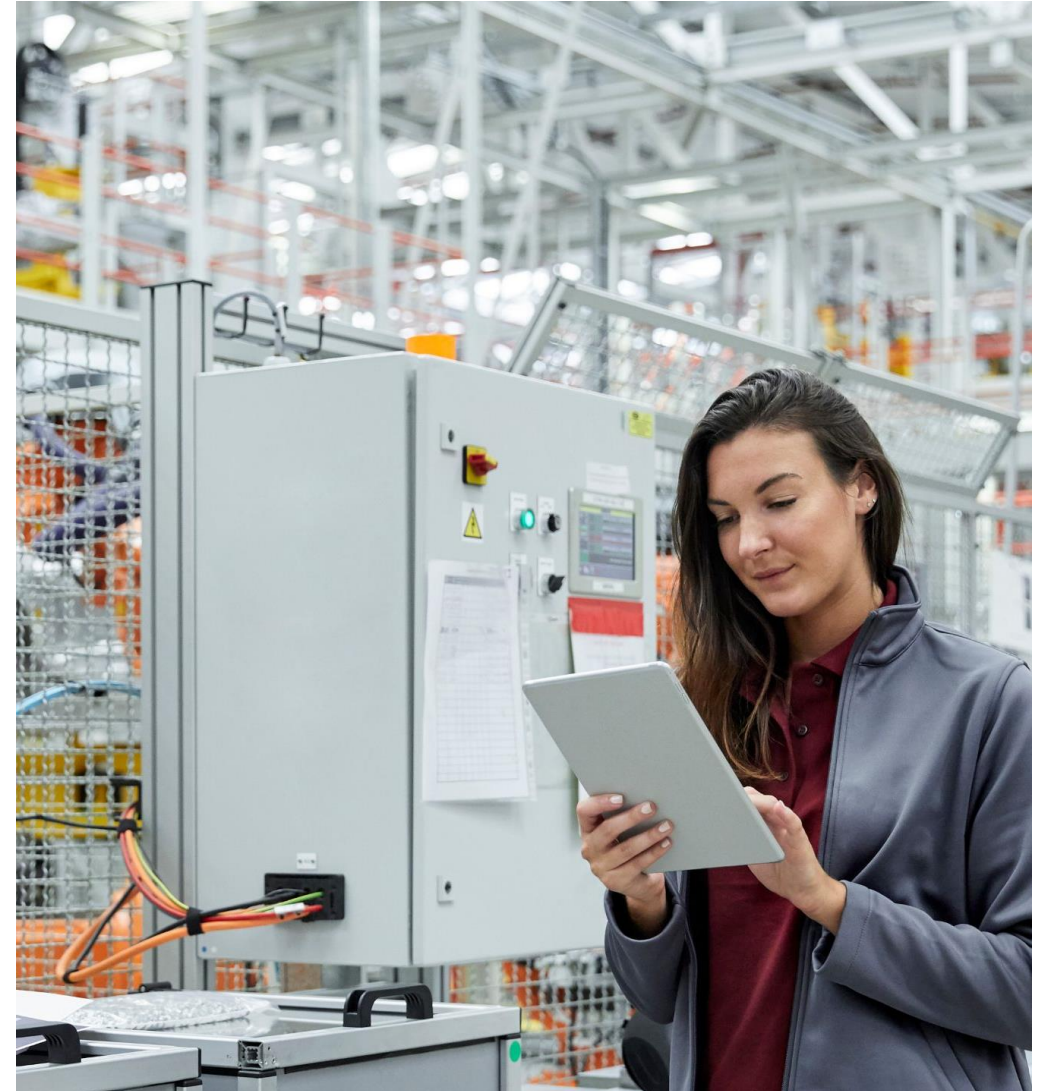
## Skills Priority List

June 2021

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Engineering at Swinburne



# Undergraduate Engineering at Swinburne

## Standard degree

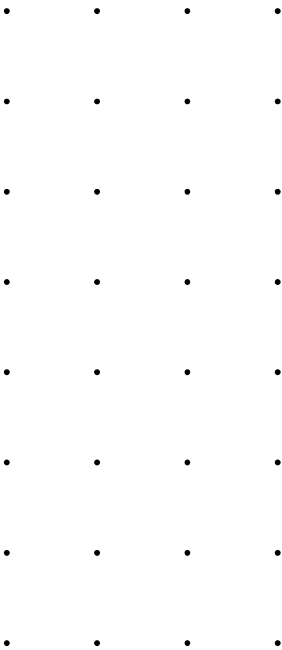
- Bachelor of Engineering (Honours) 4 years

## Professional degree

- Bachelor of Engineering (Honours) Professional 5 years

## Double degrees

- Bachelor of Engineering (Honours)/Bachelor of Applied Innovation 5 years
- Bachelor of Engineering (Honours)/Bachelor of Arts 5 years
- Bachelor of Engineering (Honours)/Bachelor of Business 5 years
- Bachelor of Engineering (Honours)/Bachelor of Computer Science 5 years
- Bachelor of Engineering (Honours)/Bachelor of Science 5 years
- Bachelor of Laws/Bachelor of Engineering (Honours) 6.5 years



# Bachelor of Engineering (Honours)

## Overview



4 years full-time or  
equivalent part-time

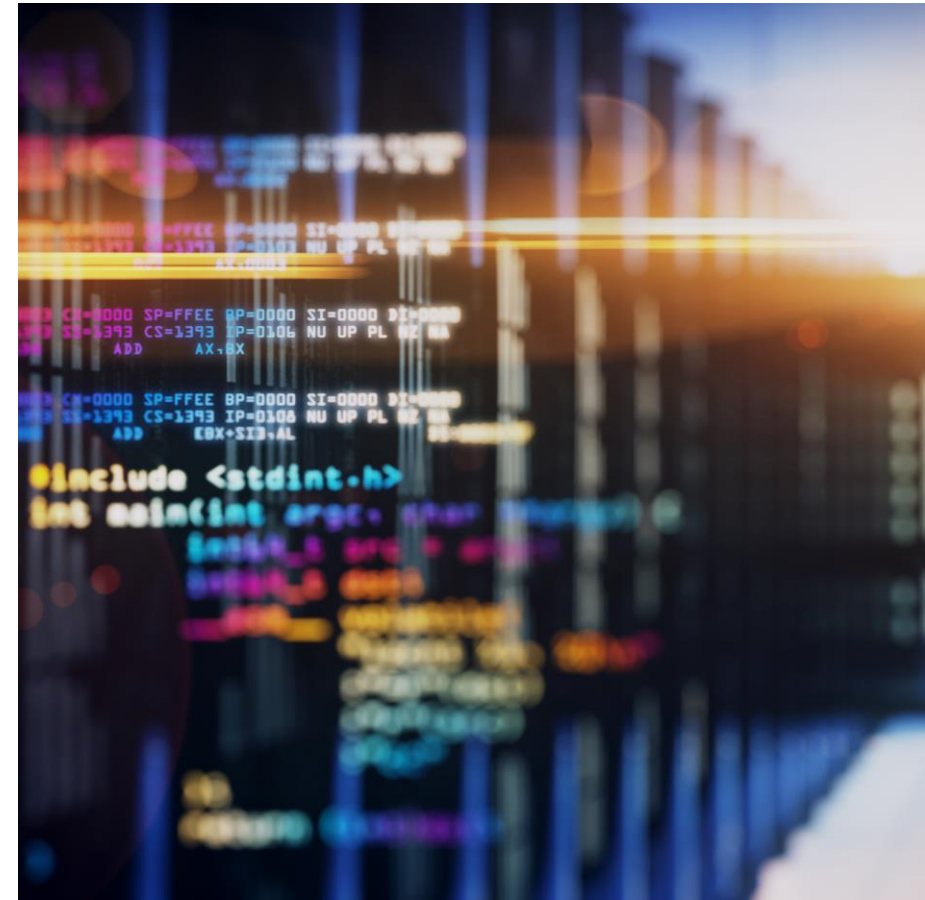


Semester 1 and  
Semester 2 intakes



Hawthorn

- Learn engineering principles, technical know-how, analytical problem solving and teamwork in a hands-on environment.
- A common first-year to explore different fields of engineering, students choose their major from their second year onwards.
- Accredited by Engineers Australia.

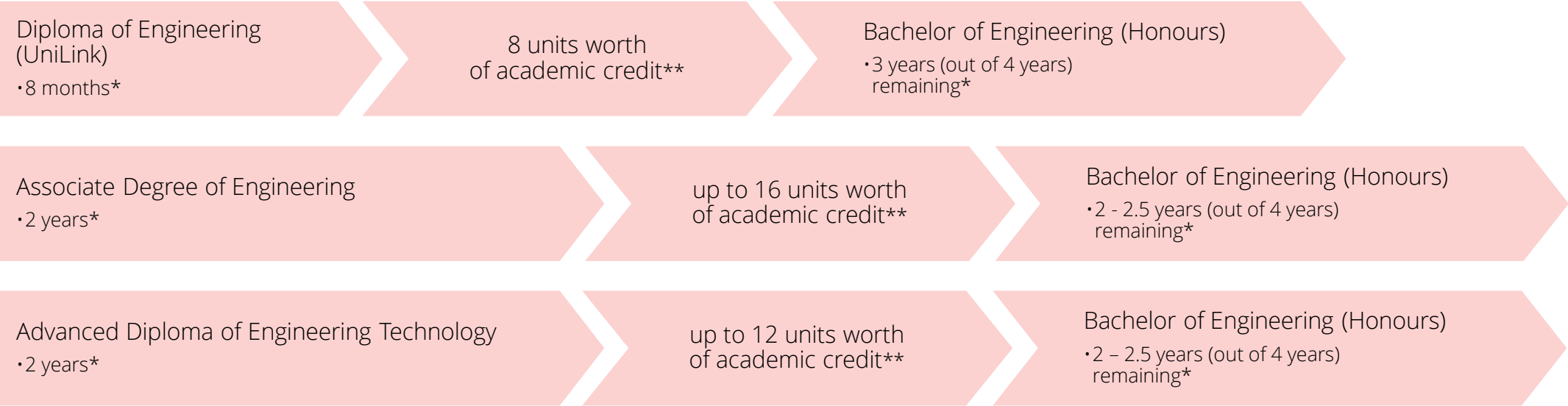


# Bachelor of Engineering (Honours)

## Entry requirements

75	min. 25	min. 20
ATAR Guaranteed Entry Score	VCE Units 3 and 4 English (except EAL) or 30 in English as an Additional Language (EAL) or equivalent.	VCE Units 3 and 4 in one of Maths: Mathematical Methods or Maths: Specialist Mathematics.

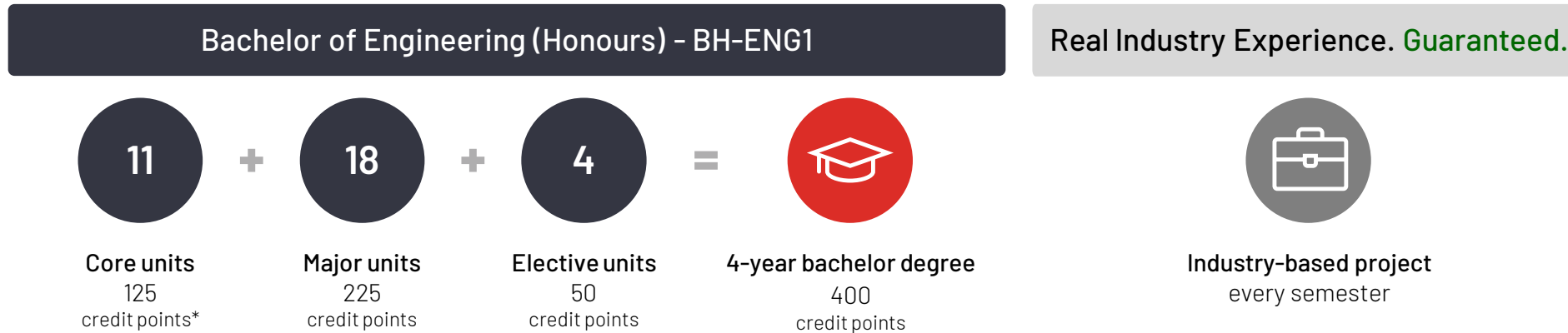
## Pathways



\* full-time or equivalent part-time.  
\*\* credit information accurate as of 17 February 2023

# Bachelor of Engineering (Honours)

## Course Structure



- Successful completion of the Bachelor of Engineering (Honours) requires students to complete units of study to the value of **400 credit points**. All units of study are valued at 12.5 credit points unless otherwise stated.
- Full-time study: 100 credit points (8 standard units) of study per year.
- Part-time study: 50 credit points (4 standard units) of study per year.
- One credit point is equivalent to one hour of study per week per semester (including contact hours and private study).

\* EAT20008 Professional Experience in Engineering is a 0-credit point unit  
Detailed information can be found on our website

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# Why Swinburne for Engineering?

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# Why Swinburne for Engineering?



## Cutting Edge Skills

- Focus on technical and professional skills.
- **World-class facilities**
- **World-class academics** with strong industry connections.



## Real Industry Experience

- Engagement with industry through **industry-linked projects EVERY semester. Guaranteed.**
- Professional placement and work experience opportunities.



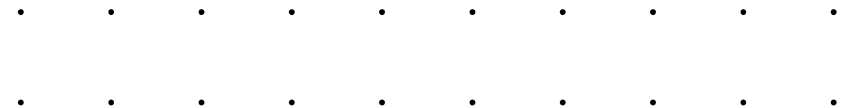
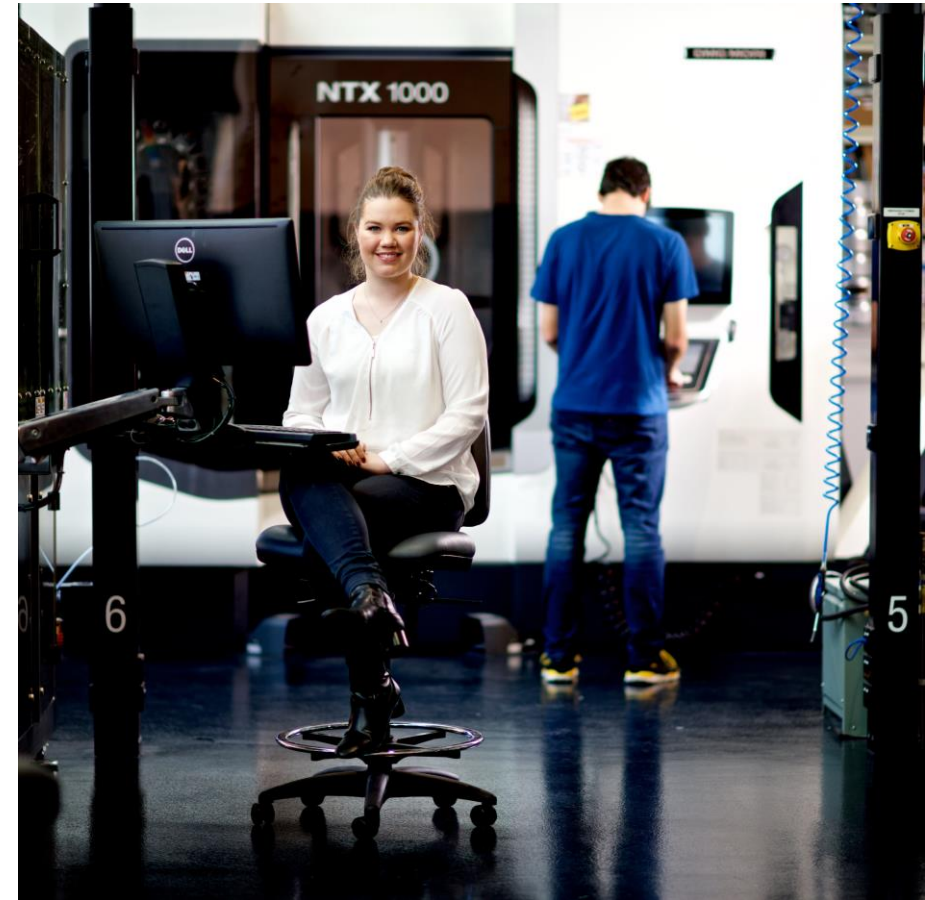
## Community and Care

- **Specialised mentoring services** support students.
- **Engineering student groups** enhance student experience
- Rich campus culture.



# World-class academics

- According to Stamford University ranking of engineers and scientist across the globe, approximately 30% of engineering staff at Swinburne are in the top 2% in the world.
- Many of our staff are industry engaged via specialist contract work and in external leadership roles (e.g. work with Boeing; Ford; Telstra; Snowy 2.0; etc.)
- Industry professionals and multinational firms are engaged to co-design and deliver relevant content. (e.g. Cost Engineering Society delivers undergraduate and postgraduate units just for Swinburne).





# World-class facilities

- Dedicated 1<sup>st</sup> year labs
- CISCO Lab
- Factory of the Future
- National Instruments Lab
- Robotics Labs
- Smart Structures Lab
- Trimble Technology Lab
- Digital Construction lab
- Impact Lab
- Mechanics Lab
- Polymer Lab
- Materials Lab



# Community & Care

## Support for Students

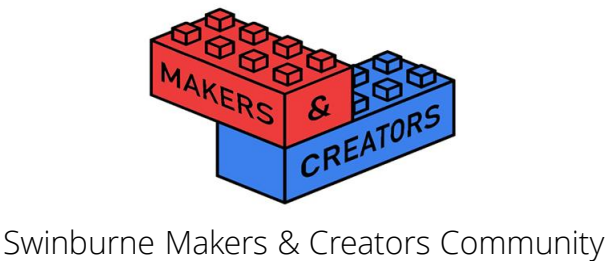
- Mathematics and Statistics Help Centre (MASH)
- Engineering mentors
  - First-year students are paired with a third- or final-year students
- Rovers
  - Peer-to-peer academic support
- Connect study groups
  - First-year study groups
- Social events
  - International Student Welcome, Careers Networking events



# Community & Care

## Engineering Student Groups

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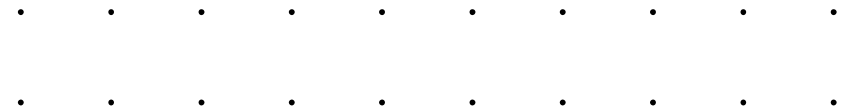


# Real Industry Experience from Day 1

ALL majors have a **Work Integrated Learning (WIL) Spine**:

- One **industry-based project** every semester in every year
- Scaffolded professional development from first-year to final year.

In addition to the WIL Spine Industry Projects, students undertake either professional placement (up to 12 months) or accreditation placement (3 months)

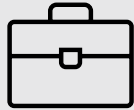




# Real Industry Experience

## Options

### Professional placements



**Duration** – 6 or 12 months, full-time

- Hands-on learning alongside industry professionals
- Get paid industry rates
- Boost your CV with full-time work experience and insight in your study area

### Internships



**Duration** – 120-140 hours

- Taste-test your career direction with real experience in the industry
- Complete part-time over a semester or as a block during summer or winter breaks.

### Industry-linked projects



**Duration** –Varies

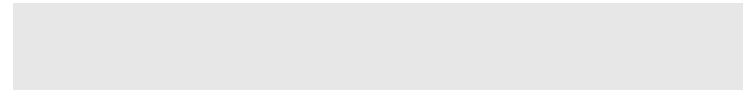
- Solve an industry problem as a part of a team within your course.
- Your team will deliver a proposal or prototype to industry partners or within class that offers a solution or adds value.



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# Engineering Majors and Industry Connections

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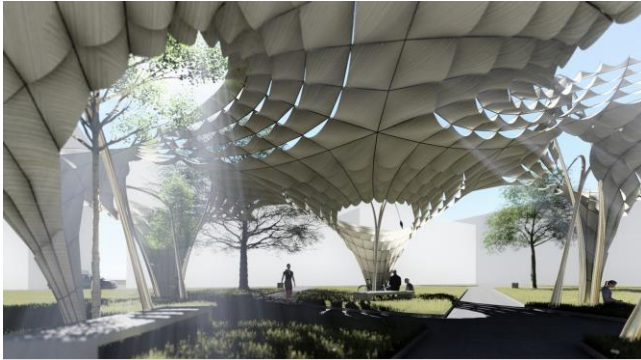


# Current and recent employers of engineering students



# Bachelor of Engineering (Honours) majors

At Swinburne we offer a range of Engineering Majors for Students to specialize in:



## Architectural

Combine structural and environmental engineering with architectural creativity. You'll be creating the buildings of tomorrow in both on-site class and unique industry placements.

Students have worked on **Climate Resilient Housing** with our industry partner, **Engineers Without Borders Australia**.



## Biomedical

Learn to improve health care and quality of life through the application of electrical, electronics and systems engineering in medicine and biology.

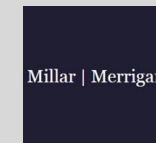
Students have worked on **Airway Pressure Monitors** with our industry partner, **The Royal Children's Hospital**.



## Civil

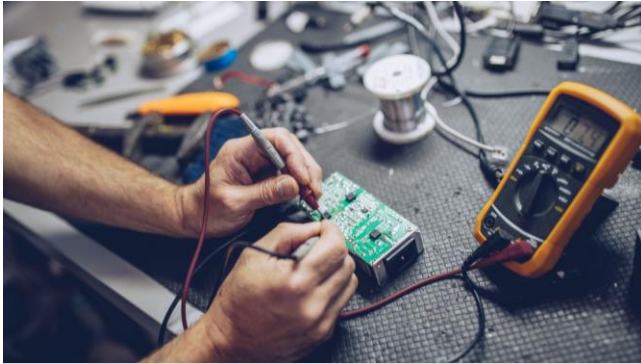
Build the future – literally – with a Swinburne civil major, featuring technical excellence and a host of real-world industry learning opportunities.

Students have worked on **Climate Resilient Water Infrastructure** with our industry partner, **Millar Merrigan**.



# Bachelor of Engineering (Honours) majors

At Swinburne we offer a range of Engineering Majors for Students to specialize in:



## Electrical and Electronics

Gain technical expertise in power system design, electronics, control systems, signal processing and embedded systems

Students have worked on a **solution to replace lead acid batteries with microturbines** with our industry partner, **Optimal Group Australia**.



## Mechanical

Learn the core concepts of mechanics, kinematics, thermodynamics, fluid mechanics and energy as you participate in industry-based projects and practical workshops.

Students have worked on **designing electric scooters** with our industry partner, **Elektrika**.



## Product Design

Combine the creativity and human-centred approach of industrial design with the academic rigour of engineering science and innovation.

Students have worked on **designing sustainable lighting infrastructure** with our industry partner, **ARUP**.



# Bachelor of Engineering (Honours) majors

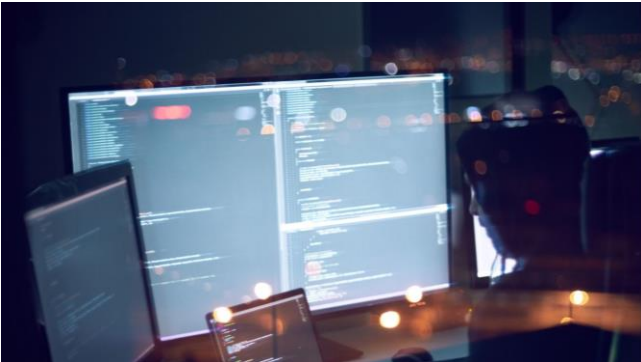
At Swinburne we offer a range of Engineering Majors for Students to specialize in:



## Robotics and Mechatronics

Discover three traditional engineering disciplines – mechanical, electronics and software – as you bolster your CV with real industry experiences.

Students have worked on **solutions for production line automation** with our industry partner, **Automation Systems and Controls**.



## Software

Dive into a career in advanced software engineering with an emphasis on teamwork, problem solving and practical software engineering skills.

Students have worked on **designing simulators to train self-adaptive software systems** with our industry partner at **CSIRO DATA61**.



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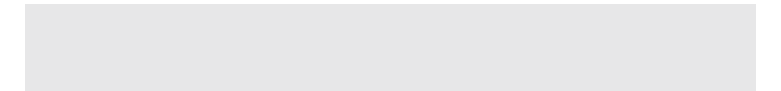


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# Engineering Work Integrated Learning

Olivia Salamone  
Final year student  
BH-ENG (Engineering and Business)

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# FROM HIGH SCHOOL TO UNI

## My VCE Subjects:

- English
- Mathematical Methods
- Italian
- Visual Communications
- Music Performance (Trumpet)
- Psychology (completed in year 11)

## VTAC First Preference:

Bachelor of Engineering (Civil) (Hons) / Bachelor of Innovation and Design  
SWINBURNE



# INDUSTRY SKILLS:

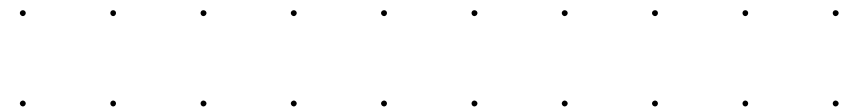
## ENGINEERING (CIVIL)

### CVE20001 – Topographical Engineering:

- Weekly field projects learning the key concepts of land surveying
- Access to industry surveying equipment and technology

### CVE20002 – Computer Aided Engineering

- Developing a key understanding for a variety of industry-based computer programs
- In-depth knowledge of AutoCAD, Civil 3D, Microsoft Excel and SpaceGass.



# INDUSTRY SKILLS:

## ENGINEERING (CIVIL)



### ENG40004– Final Year Research Project:

- Weekly laboratory experimental work to define a more sustainable alternative to cement-based concrete
- Working with current PhD students to gain valuable advice and mentoring
- Utilising Swinburne's 3D concrete printing equipment

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Millar | Merrigan

- Working with industry partner "Millar Merrigan" to develop a more sustainable proposal for their urban developments

# INDUSTRY PLACEMENT

## Knox City Council – Cadet Program Layout

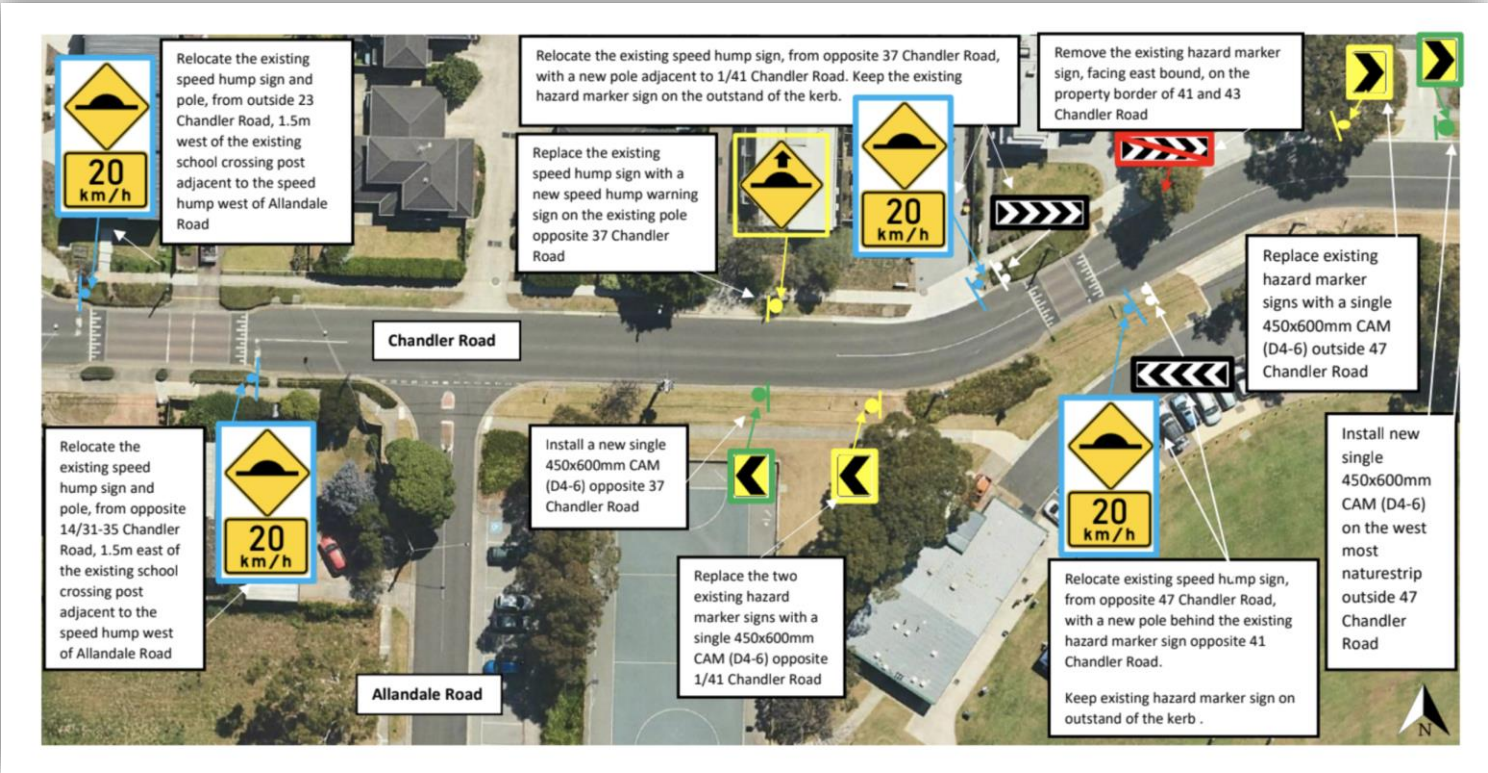


	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Asset Management														
Traffic & Transport														
Waste Management														
Open Space														
Project Delivery														
Construction														
	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24
Asset Management														
Traffic & Transport														
Waste Management														
Open Space														
Project Delivery														
Construction														



# INDUSTRY PLACEMENT

Knox City Council – Traffic & Transport Team



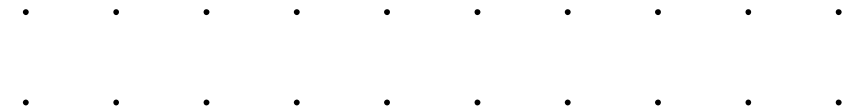
# INDUSTRY PLACEMENT

## Asset Management Valuations

755957	SP1	Dandenong Creek Trail - SP1	WANTIRNA	Concrete	Concrete - Yes	3	56.3396	2.2	123.94711
755958	SP10	Dandenong Creek Trail - SP10	WANTIRNA	Asphalt	Asphalt - Yes	3	118.6525	2.4	284.7660155
755959	SP100	Boronia Rd South - SP100	WANTIRNA	Concrete	Concrete - Yes	3	201.1592	3	603.4776018
755960	SP101	Boronia Rd North - SP101	WANTIRNA	Concrete	Concrete - Yes	2	69.57791	2.4	166.9869727
755961	SP102	Boronia Rd North - SP102	WANTIRNA	Concrete	Concrete - Yes	2	93.8683	2.4	225.2839227
755962	SP103	Boronia Rd North - SP103	WANTIRNA	Concrete	Concrete - Yes	2	48.54036	2.4	116.4968736
755965	SP107	Waldheim Rd East - SP107	BAYSWATER	Asphalt	Asphalt - No	4	289.1783	2.6	751.8636543
755966	SP108	Burwood Hwy North - SP108	BAYSWATER	Concrete	Concrete - No	3	61.14316	2	122.2863144
755967	SP109	Burwood Hwy North - SP109	BAYSWATER	Concrete	Concrete - No	4	22.90765	2.2	50.39683122
755968	SP11	Dandenong Creek Trail - SP11	WANTIRNA	Asphalt	Asphalt - Yes	2	178.4602	2.4	428.3044565
755973	SP114	Stud Rd East - SP114	WANTIRNA	Asphalt	Asphalt - Yes	3	150.6702	2.2	331.4745269
755974	SP115	Stud Rd East - SP115	WANTIRNA	Asphalt	Asphalt - Yes	4	184.9197	2.2	406.8232883
755975	SP116	Stud Rd East - SP116	WANTIRNA	Asphalt	Asphalt - Yes	4	163.9477	2.2	360.6849883
755976	SP117	Stud Rd East - SP117	WANTIRNA	Concrete	Concrete - Yes	1	5.769868	2.4	13.84768387
755977	SP118	Stud Rd East - SP118	WANTIRNA	Asphalt	Asphalt - No	5	225.3824	2.2	495.8413546
755978	SP119	Stud Rd East - SP119	WANTIRNA	Asphalt	Asphalt - No	5	187.697	2.2	412.9333653
755979	SP12	Dandenong Creek Trail - SP12	WANTIRNA	Asphalt	Asphalt - Yes	3	196.3443	2.4	471.2262721
755980	SP120	Stud Rd East - SP120	WANTIRNA	Asphalt	Asphalt - No	3	21.07391	2	42.14781197
755981	SP121	Stud Rd East - SP121	WANTIRNA	Asphalt	Asphalt - No	4	23.82341	2	47.64681588
755982	SP122	Stud Rd East - SP122	WANTIRNA	Asphalt	Asphalt - No	5	26.67351	2.2	58.68173256
755983	SP123	Stud Rd East - SP123	WANTIRNA	Asphalt	Asphalt - No	4	29.68815	2.2	65.31393667
755984	SP124	Stud Rd East - SP124	WANTIRNA	Asphalt	Asphalt - No	4	192.9149	2.2	424.4128805
755985	SP125	Stud Rd East - SP125	WANTIRNA	Asphalt	Asphalt - No	5	233.0317	2.2	512.6697747
755990	SP13	Dandenong Creek Trail - SP13	WANTIRNA	Asphalt	Asphalt - Yes	3	245.2	2.4	588.4799646
755996	SP14	Dandenong Creek Trail - SP14	WANTIRNA	Asphalt	Asphalt - Yes	3	22.1254	2	44.25079566
755997	SP144	Burwood Hwy North - SP144	WANTIRNA	Concrete	Concrete - Yes	3	211.9003	2.4	508.5608202
755998	SP145	Burwood Hwy North - SP145	WANTIRNA	Asphalt	Asphalt - Yes	3	21.33632	2.2	46.93990279
755999	SP146	Burwood Hwy North - SP146	WANTIRNA	Asphalt	Asphalt - Yes	4	25.84016	2.6	67.18440646
756000	SP147	Burwood Hwy North - SP147	WANTIRNA	Asphalt	Asphalt - Yes	3	223.2683	2.5	558.1707116
756001	SP148	Burwood Hwy North - SP148	WANTIRNA	Asphalt	Asphalt - Yes	3	24.16352	2.4	57.99244701
756002	SP149	Burwood Hwy North - SP149	WANTIRNA	Asphalt	Asphalt - Yes	5	22.32433	2.4	53.57840281
756003	SP15	Dandenong Creek Trail - SP15	WANTIRNA	Asphalt	Asphalt - Yes	1	7.580166	2	15.16033219
756004	SP150	Burwood Hwy North - SP150	WANTIRNA	Asphalt	Asphalt - Yes	3	61.56531	2.4	147.7567465
756005	SP151	Burwood Hwy North - SP151	WANTIRNA	Asphalt	Asphalt - Yes	2	21.83273	2.4	52.39856276
756006	SP152	Burwood Hwy North - SP152	WANTIRNA	Asphalt	Asphalt - Yes	4	203.3217	2.4	487.972096
756007	SP153	Burwood Hwy North - SP153	WANTIRNA	Asphalt	Asphalt - Yes	3	277.9789	2.4	667.1493555
756008	SP154	Burwood Hwy North - SP154	WANTIRNA	Asphalt	Asphalt - Yes	4	221.2466	2.2	486.7425754



## Waste Management Kerbside Reform Project

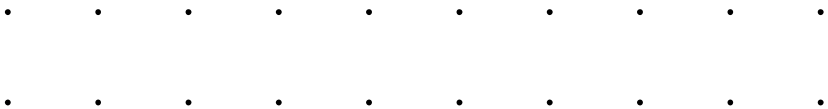




# INDUSTRY VOLUNTEERING

## Volunteering Opportunities

- Women in Stem Mentoring
- In2Science Tutoring Program
- Peer Mentor Program
- Engineers Australia Student Ambassador

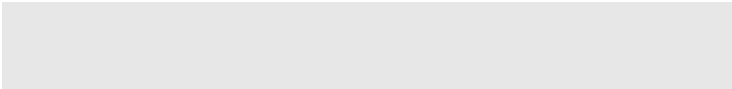


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# Engineering Industry Partner

Nathan Hadfield  
*Coordinator Construction*  
*Knox City Council*

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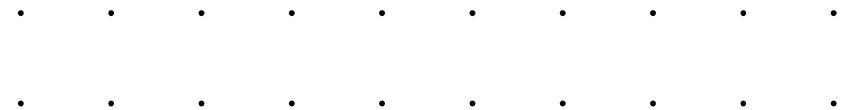
# My story

- High school – academic strengths (math, IT, visual arts)
- Early career advice
- Perusing a career choice
- University
- Gap years



# Engineering a Career

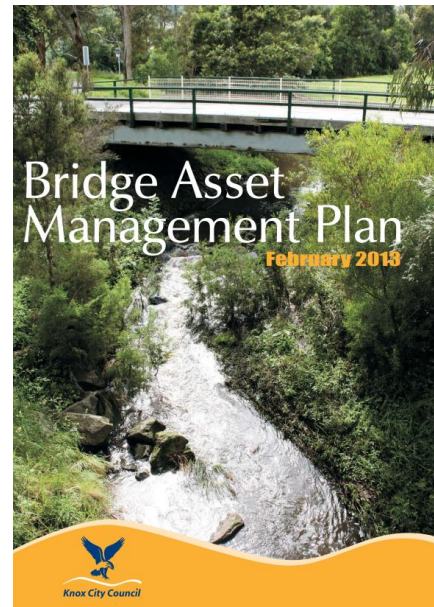
- Figuring out a career (why engineering?)
- Choosing where to study (why Swinburne?)
- Starting from behind
- Work Integrated Learning
- Career (why local government?)
- Mentoring the next generation of engineers

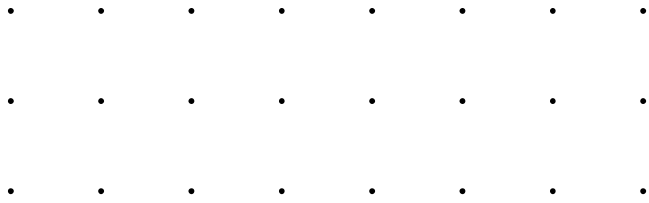




# The Next Generation of Engineers

- Ongoing partnership with Swinburne
- 12-month placements
- 3-year cadetships
- Success stories
- What local government has to offer





# Thank You

Any questions?

