Business Case:
National Standard and Competency Framework For Engineering Surveyors

May 2024

Surveyors Australia

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EXECUTIVE SUMMARY

The Australian Construction Industry generates nearly $360 billion in revenue, or around 9% of the country's Gross Domestic Product. It is reliant on Engineering Surveyors to inspect, evaluate, and manage designs and structures on civil construction projects. Currently Australia's largest and nationally significant infrastructure projects including commercial, industrial, and residential construction projects have no national regulatory system to ensure the process is consistent and or undertaken by a suitably qualified and experienced surveyor.

Without an Engineering Surveyor no construction project can commence or be completed yet Engineering Surveying in Australia remains unregulated and unlegislated. Surveyors Australia is the peak industry body representing the 16,000 surveyors working in Australia and are calling for regulatory change at a national level. Surveyors Australia

Surveyors Australia wish to partner and assist in the design, development, and implementation of a National Australian Standard of Competence for Engineering Surveyors, supported by a National Certification Framework for the Surveyors certification that is mandated and enforced in major construction and infrastructure project contracts and tender documents across Australia. This should:

i. be recognised by Federal, State, Territory and Local Governments, Local Authorities, Private and Public Asset Owners and
ii. provide comfort to project owners that their risks are mitigated through a consistent process for engineering survey work across Australia.

This document is the first step in developing a Business Case for a national standard for engineering and/or construction surveying and a competency framework for the Certification of Engineering Surveyors in Australia. It identifies the significant risks associated with an unregulated industry including harm to the public, businesses, clients, infrastructure, and residential construction. The realities of the national skills shortage have been clearly identified by various reports to government. The challenges are shown through the recruitment, retention, and remuneration of Engineering Surveyors and the impact this has on project timeframes and completions.

This paper articulates the significant commercial benefits of a standard for engineering and/or construction surveying coupled with a Certification Framework for the approximately 10,000 surveyors in Australia who undertake this work and concludes with the pathways to advancement.

As the recovery from Covid continues, the Federal Government has:

- pledged significant funding to every state and territory to meet the commitment it has made to infrastructure construction, with a focus on transportation, renewable energy, and social infrastructure.
- introduced new policies to address the national housing affordability crisis including the Federal Government's aspirational target of building 1.2 million homes and commitment of more than $25bn in new housing investments over the next decade.

These Federal Government commitments and the success of the infrastructure construction sector are placed at risk through a workforce that lacks capacity, trust, and skill due to the absence of regulation for engineering surveyors.

The Federal Government's policies on housing to meet the increased demand places significant risk on the capacity for the Surveying industry. For the construction sector to deliver a quality product within expected timeframes key resources such as Engineering Surveyors will be stretched, thus causing significant delays to residential construction.

In an unregulated industry, there is an increased risk of deploying Engineering Surveyors who are not suitably qualified and experienced to perform to the standard required.

This Business Case is part of Surveyors Australia's call to action. The submission invites stakeholders across industry and government to engage to improve the quality and integrity of the sector.

INTRODUCTION

The Australian Construction Industry[1]

The Australian construction industry is among the top contributors to the economy, generating around $450bn in revenue each year, with an average annual gross value added (GVA) of $120 billion Australian dollars. It employs over 1 million people nationally, across both private and public sectors, and its residential, non-residential and infrastructure construction segments. The private sector represents over 400,000 businesses and boasts a higher value of construction work than the public sector ($101.4bn and $14.9bn in 2023 respectively).

Non-residential construction represents commercial and industrial. Commercial construction projects include (but are not limited to), shopping malls, supermarkets, restaurants, business parks, offices, shared public areas, retail stores, parking, and retail spaces. In contrast, industrial projects include construction of a business that deals with manufacturing goods, such as manufacturing plants, power plants, refineries, distribution centres and factories.

The infrastructure construction segment comprises transport-related, energy, telecommunications, and water sector infrastructure construction. In the 2023 fiscal year, the total value of work undertaken amounted to over 50 billion Australian dollars.

The Engineering Surveyor is critical at all stages of the construction project. They are involved in the planning and execution of surveys for the location, design, construction, operation, and maintenance of civil and other engineered projects. A project cannot commence or be finalised without the input and certification of the Engineering Surveyor.

The Role of the Engineering Surveyor

One of the challenges faced by the Surveying Industry is the term "surveyor". For simplicity the following definitions apply:

a) Registered or Licensed Land Surveyor – Registered and/or Licensed by the Board of Surveyors in their jurisdiction under State/Territory Legislation authorised to define land boundaries. It should be noted that only Registered and Licensed Land Surveyors can define boundaries on a plan and submit plans through the Titles Office in their jurisdiction for the creation of deposited plans and strata plans. There are currently approximately 3,000 of these according to the Council of Reciprocating Surveyors Boards of Australia and New Zealand (CRSBANZ)

b) The Engineering Surveyor (also referred to as a Construction Surveyor) (with just over 8,500 identified by the ABS 2021 Annual Census)

[1] https://www.statista.com/statistics

1) defines and locates the natural and manmade features of the land/site (topographic survey) to inform the design phase.

2) **transfers the building/architectural designs onto land** by setting out the exact positions within legal boundaries, as determined by a Registered or Licensed Surveyor under State Legislation. Often structures and buildings are required to be in a precise position, set back from a title boundary or congruent to one. A set out survey is an integral part of the preparation for any type of construction work.

3) **sets out** by accurately marking the positions and dimensions of structures, roads, utilities, and other elements on the ground based on design plans. This process ensures that construction proceeds according to specifications. They also set out rail, road, and other infrastructure engineering designs.

4) conducts monitoring surveys at regular intervals during the project (as required)

5) confirms the accuracy of material quantity calculations and verifies that they are a true representation of materials moved (such as earthworks)

6) conducts **as-built surveys**, (also referred to as as-built, as-constructed, or as-fitted surveys) to provide formal verification of exactly how a project has been built. They document the actual results of the construction project rather than the planned layout shown in the project design which is critical for project conformance and closeout. The as-built survey will show any approved deviations from the original plant that may have occurred during the construction process, giving the opportunity to formally document those changes. Multiple as-built surveys may be completed throughout the construction process to confirm critical elevations and layouts are being met prior to advancing to successive construction phases. They are typically shown as an overlay on the original plan sheet to allow a direct comparison and easy identification of any significant deviations from the original plan. The as-built survey also provides a formal record that can be used to standardise how a project should be maintained over its lifespan.

7) collaborates with architects, engineers, contractors, and other stakeholders to ensure that project requirements are met. They provide valuable input during the design phase and help resolve any discrepancies or challenges that may arise during construction.

8) ensures that all surveying activities comply with relevant regulations, appropriate codes, and safety standards. This may include obtaining necessary permits and permissions for surveying work in sensitive or restricted areas.

9) provides quality assurance and conformance to ensure the as built is aligned to the design documentation.

What is the Problem?

Engineering Surveying has **inconsistent to no level of regulation** in Australia. There are no national regulations, no legislative references or statutory frameworks, no national standard of competence, no quality assurance framework, and no national public register for Engineering Surveyors.

Some jurisdictions have developed technical specifications for works particularly in roads and rail infrastructure. However, there is limited specifications for building works. Some jurisdictions seek to acknowledge the role of all surveyors, notably Queensland with a certification for Engineering Surveying and a registration for Associate Surveyors both of which are a voluntary registration process and not mandated.

As mentioned, the construction industry is worth hundreds of billions of dollars to the national economy. It is reliant on Engineering Surveyors to accurately set out Australia's largest infrastructure projects, and largest commercial, industrial and residential construction projects but there is no national regulatory system to ensure they are suitably qualified and experienced to deliver to acceptable standards.

Current projects of significance include:

Suburban Rail Loop (VIC)	$50 Billion
WestConnex (NSW)	$16 Billion
Sydney Metro (NSW)	$12 Billion
Snowy Hydro (NSW)	$12 Billion
Melbourne Metro Tunnel (VIC)	$11 Billion
Melbourne to Brisbane Inland Rail (National)	$9.3 Billion
Bruce Highway Upgrade Program (QLD)	$8.5 Billion
West Gate Tunnel (VIC)	$6.8 Billion
Cross River Rail (QLD)	$5.4 Billion
Western Sydney Airport (NSW)	$5.3 Billion
Melbourne Airport Rail Link (VIC)	$5 Billion
Western Sydney Infrastructure Plan (NSW)	$2.9 Billion
M80 Ring Road Upgrade (VIC)	$2.25 Billion
Metronet (WA)	$1.84 Billion
Canberra Light Rail (ACT)	$1.46 Billion
New Bridgewater Bridge (TAS)	$786 Million
RAAF Base in Tindal (NT)	$100 Million

Aside from the risk of disregard for a duty of care to the public, the absence of a standard national approach to certification and regulation of Engineering Surveyors, poses significant risk to many of the 400,000 businesses in the private construction sector, which relies on these services to be of the appropriate standard.

*"Surveyors work on billion-dollar projects, with **no guarantee** that our Survey Managers, Data Managers and Senior (engineering) Surveyors have a recognised qualification or appropriate experience. These projects are complex in nature with detailed 3D design; bridges hanging in the air, 80 storey high-rises moving in the wind, and tunnels hoping to arrive where they should. Why? Because there is no regulatory framework requiring qualification, competency, and certification."*[2]

[2] Engineering Surveyors – The Long Road to Regulation. By Colin McIntosh from Auspat Landsurvey Australia – Issue 1, February 2024, Newsletter of the Consulting Surveyors Association of Victoria

THE RISKS OF AN UNREGULATED INDUSTRY

While some States have baseline qualification requirements for an Engineering Surveyor (such as a minimum Diploma level qualification in Surveying plus 2 years' practical experience to work as a surveyor on Transport for NSW (TfNSW) projects), there is **no national standard of competency** for the industry unlike other highly skilled professional and trade occupations. Notably, surveying was not included in the recent NSW Building Bill. The opportunity for individuals to work in roles for which they are not suitably qualified or experienced, poses wide-ranging risks and challenges.

Risks faced by Businesses

Engineering Surveying requires a high level of technical skill, experience, and training. An unregulated industry is at risk of having people **performing work beyond their competency**.

If an Engineering Surveyor upsets a client through substandard work, unprofessional conduct, or malpractice, it is not only the reputation of the business that is at stake. The business itself risks a costly claim being raised against them for **negligent** service.

An unregulated industry has **no Code of Ethics and no consequences** for not adopting good business practices. Unethical companies may use unqualified persons and charge them out as surveyors for quick financial gains (see case study in CSV Newsletter, February 2024)

There is no reliable and independent register of compliant, non-compliant, or poor-quality surveyors or surveying organisations.

Businesses who do adhere to a high moral and ethical standard of practice are at risk of losing bids and tenders to survey companies with compromised business practices, when clients neglect to enforce a requirement for only qualified surveyors on their projects.

** Note Registered and Licensed Surveyors are subject to a Code of Ethics and responsible to the Board of Surveyors in their jurisdiction for complaints and unprofessional conduct. There are currently approximately 2,500 registered and licensed surveyors in Australia and a further 12,179 unregistered surveyors.*[3]

[3] An Independent Economic Analysis by BIS Oxford Economics - Determining the Future Demand, Supply and Skills Gap for Surveying and Geospatial Professionals: 2022 - 2032

Risks of Serious Harm to the Public with Financial Consequences for Public and Private Entities

The following are examples of the **risk of harm to the public** that also carry **a real risk of injury and loss of life.** There are serious financial consequences for all parties engaged in the construction phases. These risks are significantly higher in an unregulated engineering surveying environment.

Setting out foundation piles or structural piles where there could be significant infrastructure below such as gas, power, major fibre communications, stormwater, and wastewater pipes. The risk associated with disturbance or damage to existing assets include:

- physical injuries to the public
- injury or death to the site workers
- significant financial consequences for the surveying firm, or utility provider
- financial or operational consequences for the public or private entities who own or utilise the infrastructure
- investor or owners that are delivering the construction project
- indirect or Consequential Loss to owners, contractors and businesses associated with the project
- any incidents that cause disturbances or delays to construction can be costly to the property developers, the consultants, the contractors, and every stakeholder in the project chain.

Subterranean structures (e.g. tunnels) such that piles have been wrongly set out through surveying malpractice and/or incompetency.

Incorrect heights for a water catchment embankment can result in inundation or flooding if not surveyed and set out correctly nor incorporated standard surveying redundancies.

As-built surveys of buried assets that have the position of the assets incorrect – resulting in a heavy equipment striking buried assets risks injury and death.

Tunnel collapses and structural issues due to poor monitoring or surveying methodologies.

Costly Set-Out Error

If a building, tunnel, drain, road, or bridge or any major infrastructure is set out incorrectly and is not positioned in accordance with the approved design, the financial consequences can be substantial and at times catastrophic, even resulting in bankruptcy, due to the survey time and costs to remedy. A typical example is when a building is incorrectly set out over a title boundary. If it is a single-storey residential dwelling then the consequences may be minor, but if it is a $600 million high-rise apartment building the consequences of that error resonate right through the project food-chain. Often, the implications are not highlighted until the tenancy phase and costly legal and rectification proceedings begin.

This example highlights the importance for an Engineering Surveyor to be able to accurately interpret cadastral survey data, cadastral survey datasets (plans) and perform the necessary calculations and field work to 'locate' (but not determine or re-establish) a boundary. Furthermore, the Surveyor must know when to call in a Registered/Licenced Cadastral Surveyor to re-establish a boundary.

There is an increased risk of set-out error occurring in cohorts of Engineering Surveyors in Australia due to incorrect and often **illegal** pretence undertaken by **unqualified staff in an unregulated industry.** We note that it is **illegal** for anyone other than a licensed/registered land surveyor to re-establish title boundaries in Australia, which are often related to construction set out.

Risks to Clients

In an **unregulated industry**, the risk to clients is that they cannot be confident that their Engineering Surveyor is suitably qualified and experienced to perform and deliver the services.

The **lack of a national standard** against which all Engineering Surveyors are assessed, compromises the integrity and professionalism of the industry.

The **lack of mandatory requirements within Government Contracts** also increases the risk of adverse project outcomes.

Whist the Geospatial Council of Australia has a program to acknowledge national ESP-AP Certification, it gives no clarification on the competencies of an ESP-AP certified individual. It currently only requires a candidate to submit evidence of work experience and be assessed in two areas of construction surveying out of 13. (Bridge, Road, Earthworks, Drainage, Water/Wastewater network, Retaining Structures, Tunnel, Dam, Port Infrastructure, Processing Plant, High Rise Building, Rail, Other). There is no reassessment cycle (as long as the annual subscription is paid, Certification is retained) and if you are a Registered or Licenced Cadastral Surveyor then there is no CPD requirement for retaining GCA Certification as an Engineering Surveyor.

There is a huge risk to a client who represents a multibillion dollar construction infrastructure project such as for Brisbane's 2032 Olympics, that they mistake an Engineering Surveyor who has the GCA ESP-AP Certification as having proven competence against a national standard, when in reality, it is possible to gain the ESP-AP Certification by submitting work experience evidence for Construction Surveying in (for example) Dams and Processing Plants and have limited or no experience in the tasks undertaken.

Western Australia has a further risk that should be noted, as they recognise the ESP-AP Certification and automatically grant the WA Certified Practising Engineering Surveyor (CPSEng) to those who have ESP-AP.

Risks to the Infrastructure Construction Sector

The size of the infrastructure sector has increased significantly due to commitments by the Federal Government in transportation, renewable energy, and social infrastructure. As of January 2024, there were 80 energy projects in the prospective stage, awaiting funding and approval. Projections show Australia's major infrastructure pipeline expenditure in the first quarter of 2024 would primarily focus on rail, energy, and road projects, with estimated spending across all infrastructure pipeline projects of 19 billion dollars.[4]

The risk to this sector is the **lack of capacity** and the potential **inability** of an unregulated Engineering Surveying industry with no national standard of competence, to **deliver** these multi-billion-dollar projects. The risk of a disaster is ever increasing as demand increases and supply decreases.

Furthermore, the skills shortage in Engineering Surveying is influencing the labour costs of suitably qualified and experienced Engineering Surveyors, who in an unregulated industry, can be priced out of the market by unqualified surveyors with limited construction knowledge and experience.

Risks to the Residential Construction Sector

The national housing affordability crisis is being addressed by new policies[5] that are being implemented by Federal and State Governments and will increase the demand for new housing construction. As with the risk outlined above, the risk to this proposed solution to the housing affordability crisis is the limited capacity of the Surveying industry to deliver the quality of service the housing projects require, within reasonable time constraints as the skills shortage continues.

There is a further danger of infrastructure construction projects occupying key resources such as Engineering Surveyors, thus causing a **supply chain backlog** and leading to significant delays to residential construction.

[4] https://infrastructuremagazine.com.au/2024/01/30/2024

[5] On 16 August 2023, National Cabinet agreed to an ambitious new national target to build 1.2 million new well-located homes over 5 years, from 1 July 2024. This is an additional 200,000 new homes above the original National Housing Accord one million homes target agreed by states and territories last year.

THE NATIONAL SKILLS SHORTAGE

The skills shortfall in the surveying and geospatial profession will reach nearly 1,400 professionals nationally by 2024, eventually reaching more than 2,000 in 2029.[6]

The Facts[7]

The total national workforce of surveying and geospatial professionals in Australia is approximately19,000. Market demand is increasing the need for that workforce to reach 21,000 by 2032.

An extra 1500 surveyors and geospatial professionals are required each year via training, recruitment, or immigration to meet the national demand of 21,000.

Shortages will be experienced in every State and Territory, with the greatest shortfall occurring in Queensland and Western Australia due to the increasing activity in the housing sector competing with record activity in infrastructure construction and mining.

The Severe Lack of Vocational Training

According to Michelle Blicavs, CEO of Surveyors Australia, "the biggest challenge has been the Vocational Training sector with TAFE not delivering the training required".[8]

Surveying has been removed from TAFE in Queensland, Australian Capital Territory, Northern Territory and Tasmania and classes are at capacity in New South Wales. This has resulted in a national shortage of vocational training for an industry facing a chronic skills shortfall.

Queensland has no vocational training for surveying at all. This seems markedly shortsighted given the Federal Government's large funding injection into the infrastructure sector in Queensland, ahead of the 2032 Brisbane Olympics.

To help combat the vocational training shortages in surveying, Surveyors Australia has created the 'Surveyors Academy'. This is a positive solution that meets the needs of industry, training the next generation of surveyors, by surveyors, with their RTO application currently before ASQA.

[6] An Independent Economic Analysis by BIS Oxford Economics - Determining the Future Demand, Supply and Skills Gap for Surveying and Geospatial Professionals: 2022 - 2032
[7] https://www.spatialsource.com.au
[8] https://www.spatialsource.com.au

The Impact on Recruitment, Retention and Remuneration

The chronic skills shortage in unregulated Engineering Surveying is having a significant impact on the ability of companies to recruit and retain suitably qualified and experienced talent.

These skills shortages also impact on the ability to recruit professionals to train the next generation of Surveyors.

The shortage **creates competition for resources** (even amongst government projects) which often leaves the overall productivity lower as attrition rates and costs increase. This is highly disruptive often at the expense of smaller firms and a consequence of a too "hot" market, especially for those where the loss of valuable human resources can make them more susceptible to financial hardship.

The Impact on the Commencement and Completion of Projects

- A national skills shortage in Engineering Surveying has a severe impact on the commencement and completion of projects across both public and private sectors of the residential, non-residential and infrastructure construction.

- The flow on effects of delays can lead to financial losses, liquidated damages to contractors, inflationary impacts, cost overruns and adversely impact forward planning of other projects.

WHAT IS THE SOLUTION?

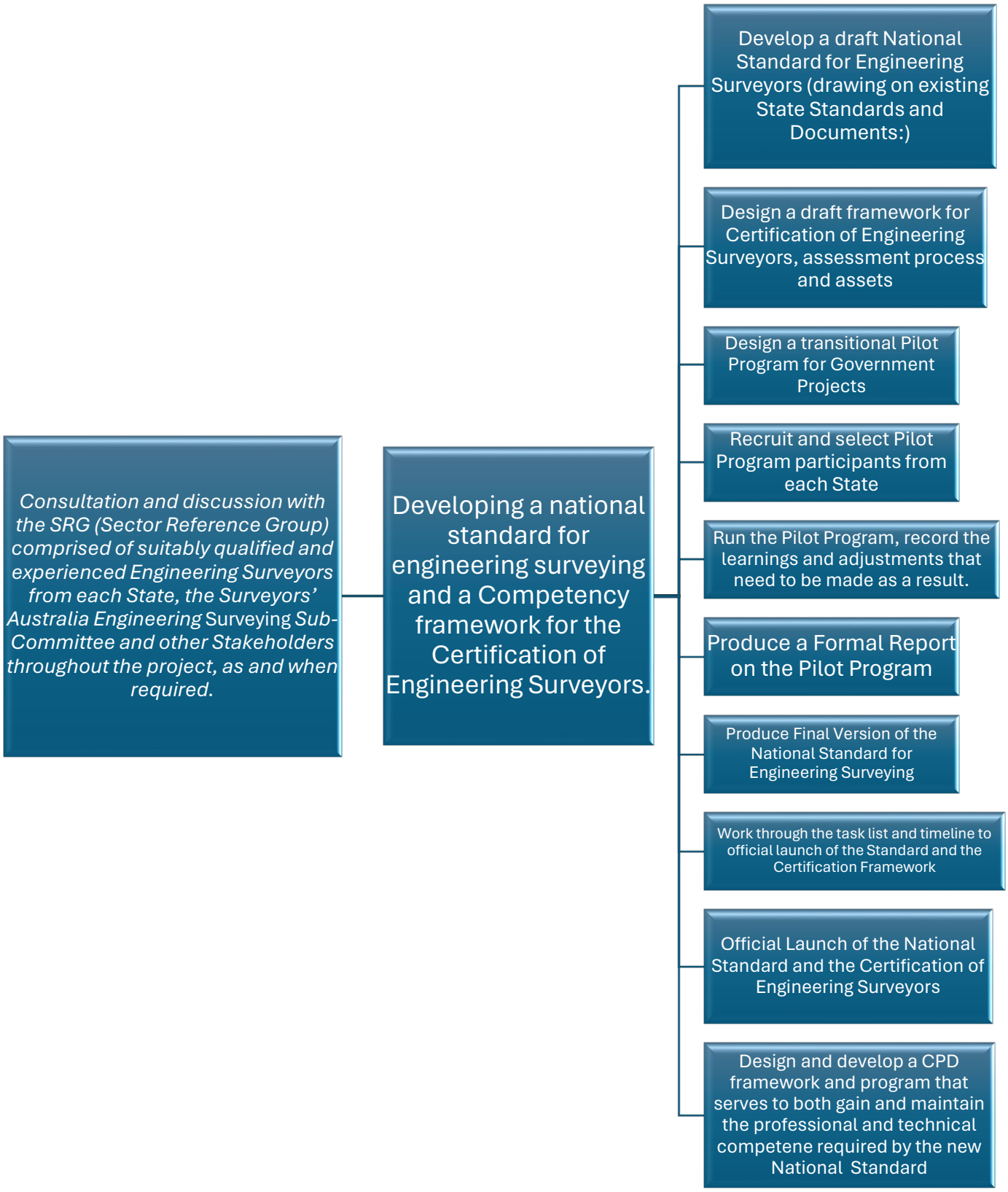
A national standard for engineering and/or construction surveying supported by a national competency framework for the Certification of Engineering Surveyors in Australia, that is:

- mandated and enforced in major construction and infrastructure project contracts and tender documents across Australia.
- recognised by Federal, State/Territory and Local Governments, Local Authorities, Private and Public Asset Owners.
- the Gold Standard for the Industry, providing comfort to project owners that their risks are mitigated through a consistent process for engineering survey work across Australia.
- supported and endorsed by industry stakeholders.

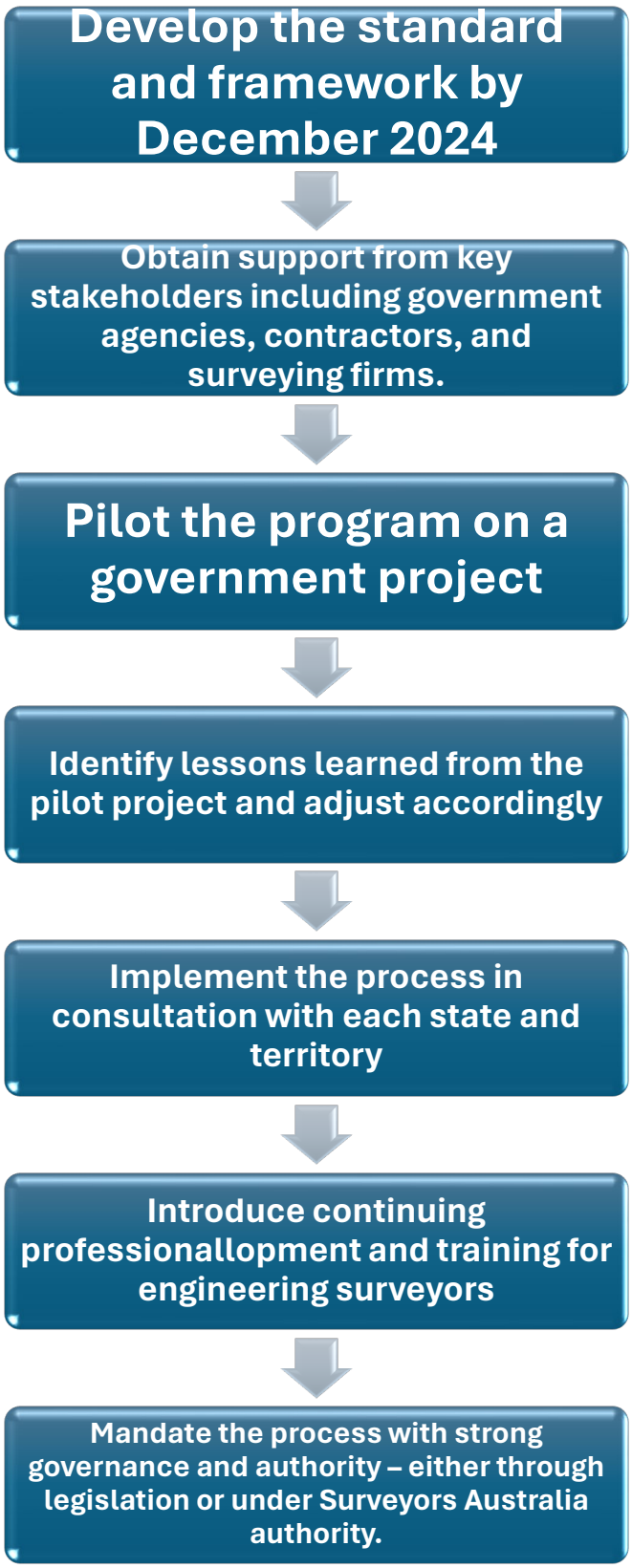
THE EXPECTED COMMERCIAL BENEFIT

- The national standard for engineering and/or construction surveying and a competency framework for the Certification of Engineering Surveyors, simplifies and streamlines the recruitment requirements for firms and corporations of all sizes.
- It pioneers a quality benchmark for the industry, presenting an opportunity for employers of Engineering Surveyors to recruit Certified Engineering Surveyors.
- It provides employers with the opportunity to offer career progression for existing staff, increase retention by funding or part funding Certification for employees. The Standard would recognise and utilise Certification and associated CPD in annual performance appraisals. It could also incentivise by attaching it to their pay scale.
- Certified Engineering Surveyors would be bound by their professional, ethical, and technical commitments and accountability to the Framework for the Certification of Engineering Surveyors, their employer's benefit by the added quality assurance that provides to the company and their clients alike.
- Employers may also benefit directly or indirectly from the integrity, respect and quality Certified Engineering Surveyors may bring to their brand and professional reputation.
- Additional revenue can be generated from the higher charge-out rates that companies can command for Certified Engineering Surveyors.
- Complying with differing National and State regulations can come at a significant cost, which a National Standard of Competence and a Framework for the Certification of Engineering Surveyors would dramatically reduce, if not eliminate.
- Interstate recognition of the Standard and Certification.
- This presents an opportunity for major construction and infrastructure project alliances to recognise Certified Engineering Surveyors for owner verifier sign-off inside the project.
- For most of the industry, this represents the first time ever, for suitably qualified Engineering Surveyors to get Certified and sign off on their own work.
- Reduction in project and liability risks, allowing opportunities to address rising and difficult to obtain insurances and indemnities.

THE PATHWAY FOR ADVANCEMENT



NEXT STEPS


Develop the standard and framework by December 2024
Obtain support from key stakeholders including government agencies, contractors, and surveying firms.
Pilot the program on a government project
Identify lessons learned from the pilot project and adjust accordingly
Implement the process in consultation with each state and territory
Introduce continuing professionallopment and training for engineering surveyors
Mandate the process with strong governance and authority – either through legislation or under Surveyors Australia authority.

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