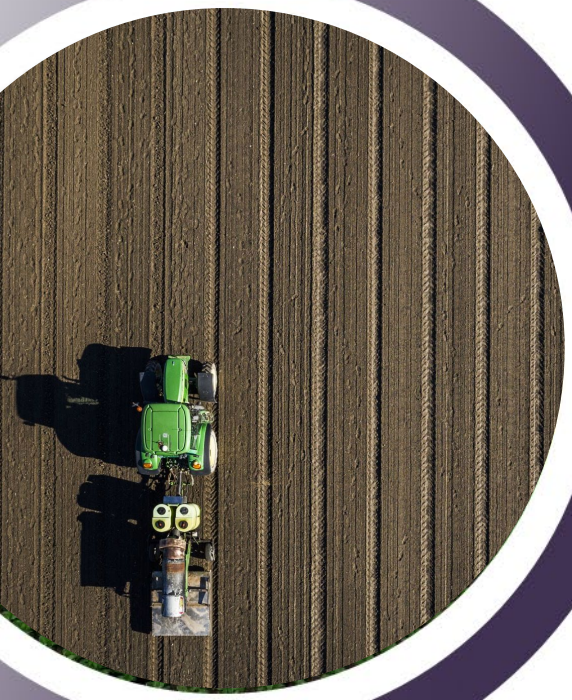
BOWEN FOOD FUTURES PRECINCT

BUSINESS CASE & FEASIBILITY STUDY



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Bowen-Gumlu Growers Association contact details

57 Warwick Rd, Bowen QLD 4805

Jenn Honnery

Chief Executive Officer
ceo@bowengumlugrowers.com.au
0447 511 994

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Abbreviations

Abbreviation	Definition
3PL	Third-party Logistics
4PL	Fourth-party Logistics
ACC	Australian Competition and Consumer Commission
AIA	Agricultural Innovation Australia
ATO	Austrian Taxation Office
AU$	Australian dollar
CRM	Customer Relationship Management
CSIRO	Commonwealth Scientific and Industrial Research
DAFF	Department of Agriculture, Fisheries and Forestry
DISR	Department of Industry, Science and Resources
ENRI	Emerging National Rural Issues
ERP	Enterprise Resource Planning
ESG	Environmental, Social and Governance
FCL	Full Container Load
FDI	Foreign Direct Investment
FIC	Food Innovation Centre
FSANZ	Food Standards Australia New Zealand
FTE	Full Time Equivalent
FY	Financial Year
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Control Points
ISO	International Organization for Standardization
KPMG	KPMG Australia
kt	Kilotonne
LCL	Less than Container Load
MCA	Multi-criteria Assessment
MLA	Meat and Livestock Australia
MSDS	Material safety data sheets
NAIF	Northern Australia Infrastructure Facility
NATA	National Association of Testing Authorities
NES	National Employment Standards
NLP	National Logistics Policy
PAYG	Pay as you go
PDF	Portable Document Format
pH	potential of hydrogen
QA	Quality Assurance
QDAF	Queensland Department of Agriculture and Fisheries
QDPI	Queensland Department of Primary Industries
R&D	Research and Development
RDC	Rural and Development Corporations
RED	Rural Economic Development
REEF	Regional Economics Future Fund for the
RTC	Ready-to-cook
SAF	Sustainable Aviation Fuel
SFE	Supercritical Fluid Extraction
SIFBI	Singapore Institute of Food and Biotechnology Innovation
SME	Small and medium-sized enterprises
t	Tonne
TBC	To be confirmed
US	United States
USA	United States of America
WMS	Warehouse Management Software

Foreword

The Bowen-Gumlu region is a powerhouse of Queensland's horticulture industry, producing a significant share of the state's crop. Yet, for all the strength and productivity of our growers, our region has long lacked the processing infrastructure needed to maximise the value of what we produce — and to turn surplus or under-utilised produce into opportunity.

The Bowen Food Futures Precinct Business Case and Feasibility Study represents a critical step forward in addressing this gap. It lays out a bold, staged pathway to transform the region's horticultural economy through value-adding processes like freeze-drying and bioactive compound extraction. By leveraging existing production strengths and emerging market demand, the Precinct model aims to return more value to growers, reduce waste, create new jobs, and build long-term economic resilience.

This Business Case and Feasibility Study was developed with the support of the Queensland Government. We are grateful for their recognition of the potential that regional innovation holds — and for their investment through the Regional Economic Future Fund to bring this concept to life.

At its core, this project is about creating a future where our region's natural abundance is matched by opportunity: where what we grow can be processed, branded, and sold at its highest possible value — right here in Bowen.

We commend this report to stakeholders across government, industry, and the broader community as a blueprint for regional transformation grounded in sustainability, innovation, and collaboration.

Bowen Gumlu Growers Association
2025

Business Case Context Overview

Background

The Bowen-Gumlu Growers Association (BGGA) is developing the Bowen Food Futures Precinct, aiming to diversify the Greater Whitsunday region's food and agriculture sector and enhance its bioeconomy credentials.

BGGA has received AU$2.1 million in support through the Queensland Government's Regional Economics Future Fund (REEF) for two key initiatives - developing a comprehensive Business Case Proposal for the Precinct and establishing a Pilot Plant Facility. The project's main goals are to drive innovation and diversify economic growth in a key regional industry, whilst also promoting sustainability in the region.

The Business Case Proposal builds on existing research to develop and evaluate the viability of the precinct and an initial multi-commodity processing facility. This analysis will explore opportunities such as a Bioenergy Facility and a Food Innovation Hub to further boost the precinct's value proposition.

Objective

The Bowen Food Futures Precinct (the Precinct) aims to drive utilisation of currently underused produce, provide a return to growers and increase diversification in the Greater Whitsunday region's food industry through collaboration and sustainable practices. The core focuses of this project include:

- Fostering collaboration between complementary agricultural producers, bio-manufacturing, and value-adding businesses within an integrated agri-industrial precinct.
- Establishing a production and processing facility close to raw ingredient sources to reduce food miles and associated emissions, improve efficiencies, and expand trade potential.
- Creating new industry and skilled job opportunities to support local economic and social growth.
- Implementing innovative solutions to address energy, input and organic waste issues, promoting environmental sustainability.

Approach

The approach involved an evaluation covering supply chain, market demand, upskilling assessment, feasibility studies, stakeholder engagement, financial projections and master plan development. This approach included:

- **Supply and Value Chain Analysis for Process Selection:** Conducted analysis to select which process will be conducted at the facility.
- **Market Sounding:** Conducted meetings with industry stakeholders to identify challenges and opportunities in the region, as well as to identify potential investors, and determine process and equipment requirements.
- **Financial and Economic Analysis:** Compiled and analysed financial data to develop comprehensive revenue forecasts, operating costs, and return on investment analysis.
- **Precinct Concept Master Planning:** Developed a high-level master plan for the Precinct’s layout and operations, including a site options analysis.

Principles Underpinning the Business Case

*The framework of the Bowen Food Futures Precinct is guided by core design principles ensuring scalability, inclusion of diverse commodities and risk mitigation. Key strategies include fostering strong grower partnerships and leveraging regional branding for market positioning. The facility's main processes will include **bioactive compound extraction** and **freeze-drying**. Financial sustainability is maintained through investments, operational efficiencies, and a phased scaling approach, driving profitable operations aligned with market demands.*

Scalability and MVP Volume Balance:

The Bowen Food Futures Precinct employs a phased approach that ensures incremental investments are aligned with proven market demand, thereby reducing risks and maintaining operational flexibility. Each phase builds upon the success of the previous stage, allowing for necessary adjustments and optimisations. This scalability is reflected in the facility's design, which supports a gradual increase in production volumes—from pilot operations to large-scale commercial throughput—as demand grows.

Multi-Commodity Inclusivity:

The facility's end processes are designed to accommodate a variety of commodities, initially focusing on mango, tomato, and capsicum. This flexibility ensures diverse product lines and supports future growth by allowing for additional commodities to be incorporated. Such inclusivity provides resilience against demand fluctuations for specific products and enhances the Precinct's capability to meet varied market needs.

Grower Engagement and Returns:

Ensuring strong commercial arrangements and governance structures is crucial for fostering grower commitment and profitability. Long-term supply agreements with local producers offer financial stability and confidence, securing a consistent supply chain. Transparent communication and mutual benefits form the foundation of these partnerships, encouraging sustainable practices and promoting ongoing product supply.

Diversified Risk and Process Linkages:

The facility adopts processes that diversify risk through multiple end uses and pre-processing principles. This includes expanding product lines to bioactive compounds such as lycopene and β-carotene in later phases. A robust stage-gate and milestone scaling approach ensures financial and operational readiness before further expansions, mitigating potential risks associated with premature scaling.

Regional Branding and Market Positioning:

Leveraging the Bowen-Gumlu region's brand provides a significant market advantage and recognition. The facility strategically enters retail and export markets, tapping into trends of health-conscious and convenience-oriented consumer segments. This regional branding, combined with targeted marketing efforts, enhances consumer perception and strengthens product positioning in the marketplace.

Financial Feasibility and Operational Efficiency:

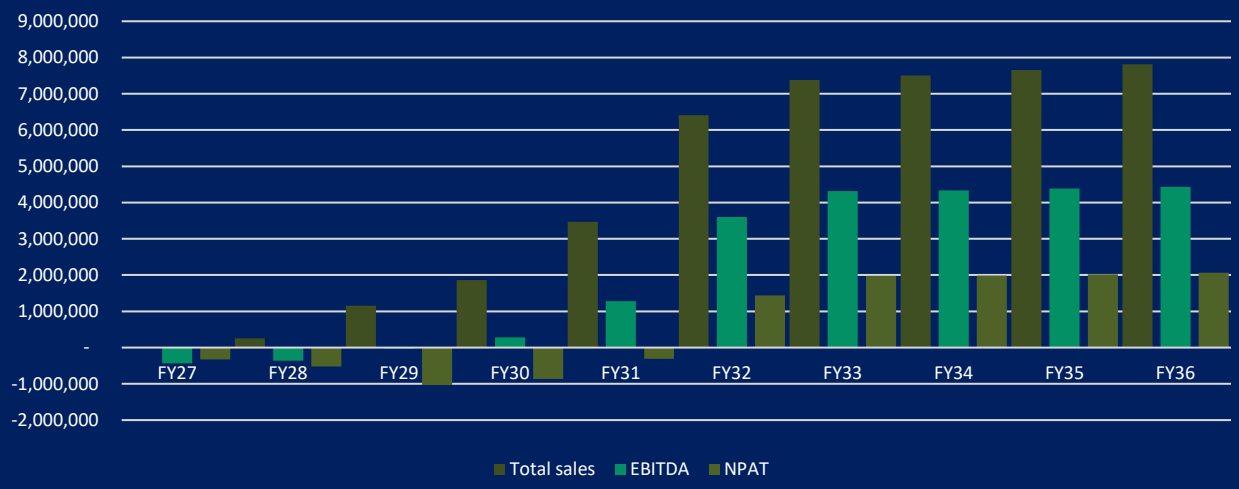
Financial projections indicate the facility will achieve net profitability by year six (FY32). Key capital investments are managed prudently, and overhead costs as a percentage of sales are reduced through strategic scaling. This ensures sustainable profitability and supports the long-term growth objectives of the Bowen Food Futures Precinct. The key capital expenditure required for the facility is the Freeze Dryer

Financial Overview

The facility's financial projections indicate strong potential for profitability and positive cash flows, backed by strategic capital expenditures and prudent cash flow management.

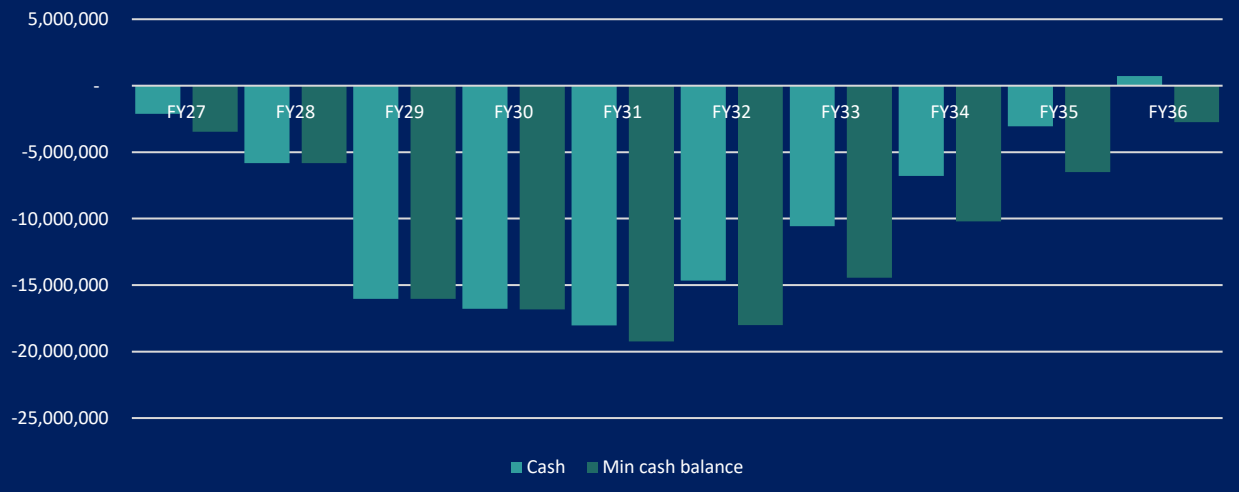
The facility is forecast to reach a net profit in year six (FY32) of operations, as the business reaches a scale that allows for efficiencies in production, and a reduction of overheads as a percentage of sales. By FY33, the business is expected to generate a net profit of just under AU$2 million year-on-year, up to AU$2.06 million in FY36.

Figure 1: Forecast Sales and Earnings (AU$)



Operating cash flows are anticipated to reach positive levels in year six (FY32) of operations, driven by sales volumes. Operating cash flows during the pilot/establishment years may need to be supplemented with an overdraft facility (up to AU$550,000) to meet short-term cash requirements while the facility scales.

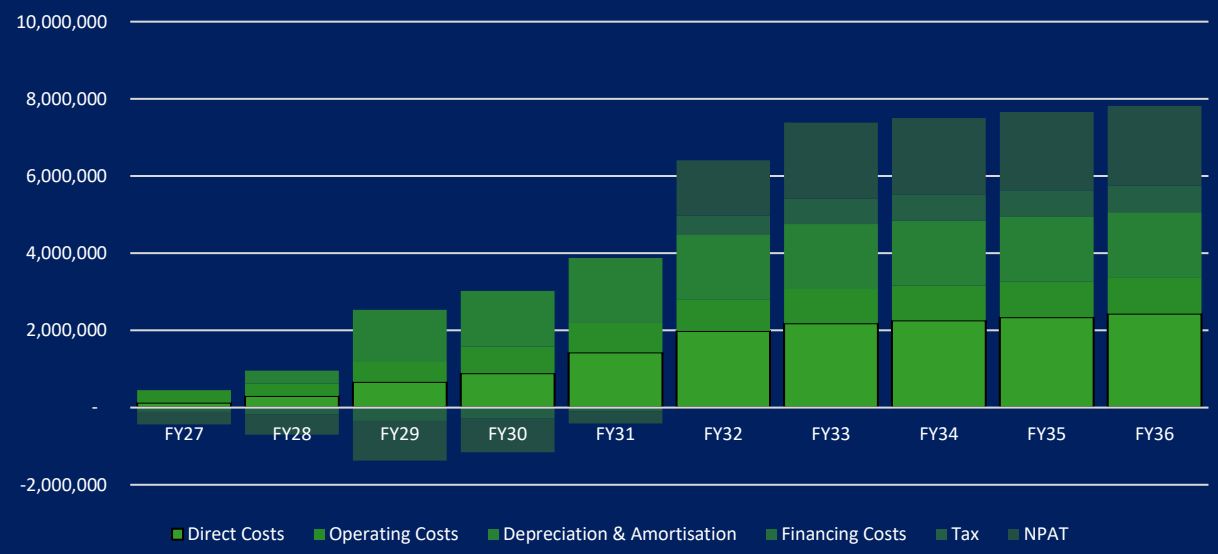
Figure 2: Cash Balance (AU$)



The key capital expenditure required for the facility is the Freeze Dryer. This includes an entry-level machine at 100kg capacity (AU$390k) for year 1 – 2, a 600kg capacity machine (AU$1.6 million) for year 3 – 4, and a 1.8 tonne capacity machine (AU$2.9 million) for year 5 and beyond. *Note production capacity upgrade timings in reality are subject to offtake agreements being secured before further expansion to mitigate financial and cash flow risks.*

By FY33, the facility's cost structure is expected to stabilise, with a 70% gross margin, 58% EBITDA margin, and 27% NPAT margin. Costs for the facility are largely driven by raw materials (~AU$1 million), manufacturing wages (~AU$900k), and overhead wages (~AU$700k) – estimates for FY33 and beyond.

Figure 3: Cost Profile (AU$)



THE REGION AND BUSINESS CASE CONTEXT

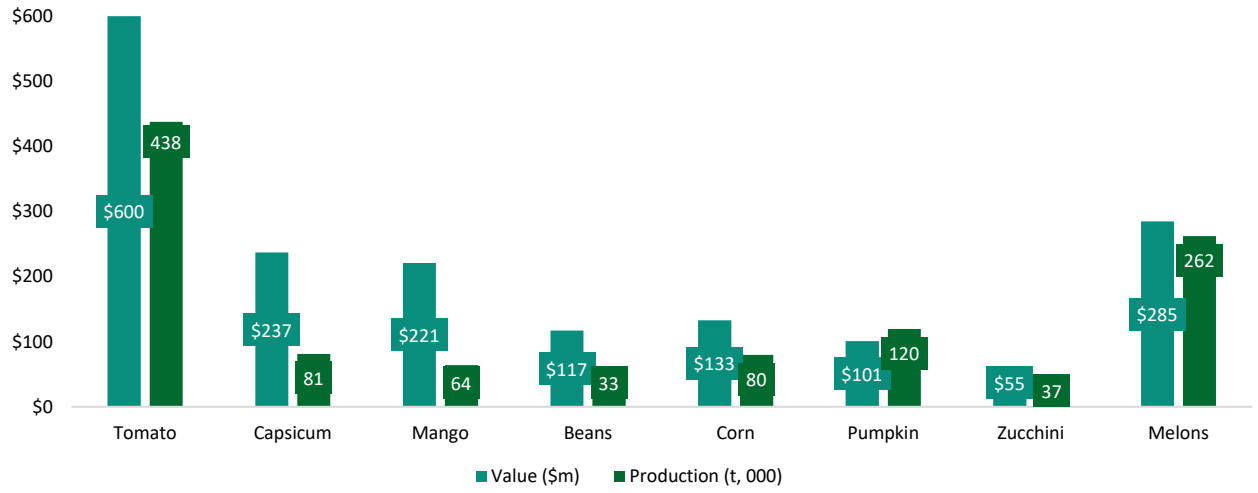
The Region and Demand for Further Processing

Queensland is Australia's leading state for fruit and vegetable production, generating over AU$3 billion annually and employing approximately 25,000 people. [1]

The horticulture industry, which is Queensland's second-largest primary industry, produces AU$1.8 billion worth of fruit and nuts and AU$1.2 billion worth of vegetables at farmgate annually. [2, 3] With 2,800 farms, Queensland produces more than 120 varieties of fruits and vegetables, including 94% of Australia's bananas, 72% of its chillies, 53% of its capsicums, 45% of its mangoes, 38% of its melons, and 11% of its fresh tomatoes. [4, 5]

The majority of Queensland fruit and vegetables are sold directly to retailers through direct supply agreements. The Brisbane Markets serve as the state's primary distribution hub for fresh produce. The export value of vegetables, fruits and nuts from Queensland, excluding chickpeas and other leguminous vegetables, amounts to AU$464 million. [6]

Figure 3: Fruit and Vegetable Production in Queensland, 2024 (thousands of tonnes, AU$ millions)



***Source**: Australian Horticulture Statistics Handbook 2023/24*

The Bowen-Gumlu region is Queensland's largest producer of winter vegetable crops, generating approximately AU$650 million in farm gate production annually. [7]

Key commodities grown in the Bowen-Gumlu region include tomatoes, capsicum, mangoes, cucurbits, beans, and corn. Tomatoes contribute approximately AU$190 million annually, while capsicum contributes AU$77 million. [8] Bowen and Burdekin account for roughly 33%, valued at approximately AU$33 million annually, of Queensland's 43%-45% share of national mango production. [9] Agriculture is the area's third-largest industry by output and second-largest employer, with BGGA growers employing 1,500 workers year-round and an additional 2,000 during harvest. [10]

99% of the produce grown in the region is currently transported outside the region, primarily to the southern markets of Brisbane, Sydney and Melbourne, with 10-15% exported overseas. [11] This is further supported by the 2021 Census data, which indicates that Bowen's population is only 9,874—significantly smaller in comparison to the volume of produce grown locally. [12]

The Bowen-Gumlu region loses up to AU$228 million worth of horticultural produce annually. [xiii]

With an estimated 30-40% of produce being lost before it reaches the end consumer, roughly over 118 thousand tonnes of produce is lost in Far North Queensland every year. As a key agricultural producing region, Bowen-Gumlu generates a significant amount of this unused produce. Severe weather events, declining fresh fruit and vegetable consumption among Australians, stringent supermarket quality standards, and supply chain mishandling contribute to produce wastage.

When markets are saturated with produce, the cost of picking fruit and vegetables often exceeds their market value. This leads to produce rotting in the fields or being used as animal feed, meaning almost no financial returns to growers. Consequently, growers lose money on the inputs required for production, including fertiliser, farm labour, water, electricity, and other factors.

The Bowen-Gumlu region could greatly benefit from a processing facility that:

1. Utilises the abundance of unused produce in the region.
2. Generates a return for growers.

The processed horticulture industry offers entry opportunities, with the global market expected to rise from AU$585.7 billion in 2024 to AU$1.1 trillion by 2034 at a CAGR of 6.3%.[14,†]

Key drivers of increased demand for further processed produce include the desire for convenient food and drinks and condensed health benefits.

These factors have led to substantial market growth in various further processing horticultural industries, as seen in Figure 4.

Figure 4: Australian and Global Market Size for Horticulture Further Processing, and Global Market Growth

Product	Australian Market (AU$, Millions)†	Global Market Size (AU$, Millions)†	Global Future Potential Market (CAGR)
Diced Fruit	$293.0[15]	$29,093.1[16]	5.5%[17]
Juice	$734.2[18]	$215,407.5[19]	3.5%[20]
Dried Fruit	$139.3[21]	$40,478.1[22]	4.6%[23]
Frozen Fruit & Vegetables	$667.5[24, 25]	$42,841.1[26]	2.3%[27]
Canned Fruit & Vegetables	$312.17[28]	$162,341.4[29]	2.7%[30]
Nutraceuticals & Pharmaceuticals	$11,074.9[31]	$707,216.9[32]	4.7%[33]
Freeze-dried Fruit/Vegetables	$56.5[34]	$12,855.4[35]	6.9%[36]
Alcohol (Industrial)	$164.0[37]	$284,412.0[38]	8.2%[39]

Not every processing market is viable; despite the canning growth, a major domestic company's canned peach sales dropped by 37.5% between 2023 and 2024 due to cheap imports.[40]

There is clear demand both domestically and internationally for further processed horticultural products. However, a successful facility within the Bowen-Gumlu region needs to utilise the abundant feedstock and offer a return to growers, as well as be achievable from a capital cost perspective. The following key trends eliminate viability:

- **International Market Saturation**: Shelf-life stable products allow international low-cost labour entities to flood the Australian market. Air drying, canning, and freezing all lack market opportunities due to cheaper alternatives found from Asian competitors. A major domestic company's canning factory has recently closed its Australian production due to market competition.
- **Lack of Returns and Demand**: Juicing lacks a clear return due to the low dollar returns received from it. It is primarily viable as a secondary product. The same issue exists with pureed fruit; while market growth is there, returns remain low and markets are saturated.
- **Complexity and High Competition**: Alcohol and other fermentation-related industries require substantial investment and face extremely high market competition. Precision fermentation products face high future competition due to increased investment.

The process of 'bioactive compound extraction', in addition to 'freeze drying', will utilise the Bowen-Gumlu region's unused produce and provide a return to growers.

When comparing processes that can be conducted on the region's unused produce, such as juicing, dicing, chopping, fermentation and canning, bioactive compound extraction offers key benefits from both an **input/feedstock** and **market demand** perspective. This process utilises the region's produce, primarily tomatoes and capsicums, to produce bioactive extracts, which serve as inputs for high-growth industries such as nutraceuticals.

Bioactive compound extraction is the process of removing and purifying useful and health-promoting substances from natural sources such as fruits and vegetables. These extracted compounds can be used in making medicines, health supplements, nutritious foods, and skincare products.

At a high level, bioactive compound extraction involves sourcing produce, freeze-drying it into pieces, breaking the pieces into powder, and then extracting the bioactive compounds using an extraction method. The chosen extraction method for this facility is supercritical CO_2 extraction, which uses carbon dioxide at high pressure and temperature to dissolve and isolate the bioactive compounds efficiently, ensuring a high-purity end product.

Figure 5: High-Level Overview of Bioactive Compound Extraction Process

Raw Material Sourcing

Produce is procured from growers

Freeze Drying into Pieces

Produce is freeze-dried to create freeze-dried pieces

Pieces Processed into Powder

Freeze-dried pieces are converted into high-value nutrient-rich powder

Bioactive Compound Extraction

High-value extracts are obtained through Supercritical CO_2 Extraction

End Sale Channel

Freeze-drying within the facility will act as a secondary product.

Bioactive compound extraction includes several secondary steps (as seen in Figure 5), one of which is the freeze-drying of produce. Freeze-drying can produce high-nutrient freeze-dried pieces and powders. For example, if the end product aimed to be produced is lycopene, freeze-dried pieces need to be created first, then ground into powder before the bioactive compound can be extracted.

These end products (powders and pieces) have diverse distribution channels across ingredient manufacturers, retailers, and potentially export markets. Hence, by conducting bioactive compound extraction at the facility, the facility can capitalise on the already required freeze-drying process by creating additional freeze-dried products.

The facility will focus on the production of freeze-dried pieces, powders, and bioactive compounds.

In the pilot stage of the facility, freeze-drying will be the primary process. During the pilot stage of the facility (1-2 years), freeze-drying will be conducted; however, bioactive compound extraction will not take place. This decision is due to the high capital costs, complexity, and the need to establish market connections associated with bioactive compound extraction.

Freeze-drying, a necessary step in bioactive compound extraction, will be the primary process used to produce freeze-dried pieces and powders. Bioactive compound extraction will be implemented during the small-scale commercial stage (3-5 years) and the large-scale commercial stage (5+ years). For further details on the scaling of the facility and its intended purpose, please refer to 'Detailed Outline of Facility Operations' within Operating Plan.

The primary produce processed in the facility will include capsicums, tomatoes, and mangoes.

During the pilot stage, tomatoes and capsicums will be processed into tomato and capsicum powders, while mangoes will be processed into freeze-dried mango pieces. In subsequent years, the facility will incorporate the extraction of bioactive compounds from these powders, specifically focusing on lycopene from tomato powder and β-carotene from capsicum powder.

Freeze-dried Pieces (Mango)

- **Overview:** Freeze-dried pieces are the result of a dehydration process that removes moisture from produce by sublimation, directly converting ice to vapour without passing through a liquid phase, while preserving the flavour, texture, and nutrients.
- **Input Feedstock**: Mango will be the primary produce processed into freeze-dried pieces; however, more produce options may be included depending on supplier arrangements and consumer demands.
- **End Sale Channels:** Sold to health food stores, commercial ingredient suppliers, gourmet food markets, and wholesale distributors.
- **Production Timeline:** Produced from the onset of the Bowen Food Futures Precinct's operation.

Freeze-dried Powders (Tomato and Capsicum)

- **Overview:** Freeze-dried powders are made by finely grinding freeze-dried pieces to create a nutrient-dense ingredient.
- **Input Feedstock**: Due to previously successful trials, tomatoes and capsicums will be the primary produce converted into freeze-dried powders. Mangos will also be trialled initially, yet most likely in smaller batches due to the smaller market size.
- **End Sale Channels:** Distributed to manufacturers of nutritional supplements, food additives, smoothie mixes and specialised health products.
- **Production Timeline:** Produced from the onset of the Bowen Food Futures Precinct's operation.

Extracted Bioactive Compounds (Tomato and Capsicum)

- **Overview:** Extracted bioactive compounds, including lycopene and β-carotene, are derived using advanced supercritical fluid extraction from tomatoes and capsicums, respectively. The products can be produced in oil and powder form.
- **Input Feedstock**: In line with previously successful trials, tomatoes and capsicums will be the primary produce (converted first into powder) utilised in bioactive compound extraction.
- **End Sale Channels:** Supplied to pharmaceutical companies for medicinal use, cosmetic manufacturers for skincare products and the nutraceutical industry for health and dietary supplements.
- **Production Time:** Will be produced from the small-scale commercial facility stage.

MARKET ANALYSIS

The market drivers behind conducting bioactive compound extraction and freeze-drying at the Bowen Food Futures Precinct

Bioactive compound extraction was chosen as the primary process to be conducted at the facility, with freeze-drying being a complementary process that is conducted prior to bioactive compound extraction (see Operating Plan for full value stream breakdown). When analysing viable processes that could be conducted at the facility, such as canning, juicing, dicing, and fermenting, **bioactive compound extraction and freeze-drying show commercial opportunity in the following areas**:

End Channels | **Market Size** | **Secondary Processes** | **Emerging Industry** | **Inclusivity of Feedstock**

End Channel Options

Bioactive compounds, specifically lycopene and β-carotene, produced at the facility can be incorporated into various end products, particularly within the expanding nutraceutical market. Additionally, freeze-drying provides access to other market segments, including retail freeze-dried pieces (e.g., mango) and high-nutrient powders.

Market Size and Growth (Domestic and Export)

The Australian nutraceutical market, of which lycopene and β-carotene would be an input into, is estimated to grow from AU$11.6 to AU$14.8 billion from 2025 to 2030, a CAGR of 5.04%. [41,†]

The Australian dried fruits market is projected to grow from AU$137.8 million in 2023 to an estimated AU$238.8 million by 2032, with a CAGR of 6.12% from 2024 to 2032, driven in part by the increasing popularity of freeze-dried products. [42,†]

Additionally, bioactive compounds' potential for export improves their overall value proposition, with China, India, and Japan all experiencing significant demand growth. Japan's nutraceuticals market alone is forecast to grow from AU$34.9 billion in 2024 to AU$63.6 billion by 2033, exhibiting a CAGR of 6.37%. [43,†] Exports from the facility could focus on the increased demand for reliable, well-produced nutraceuticals and heightened health consciousness stemming from the COVID-19 pandemic.

Secondary Processes

The bioactive compound extraction process includes secondary steps to create diverse products. These include previously mentioned freeze-dried pieces and powders, as well as probiotic juices and chopped or pureed fruits and vegetables. This allows the facility to explore additional product channels, subject to market conditions.

Emerging Industry

Advancements in extraction technologies, such as supercritical CO_2 extraction, are enhancing the quality and purity of plant extracts, making them more suitable for high-end uses in pharmaceuticals and personal care products. The cosmetic industry, in particular, is adopting plant extracts with anti-ageing, anti-inflammatory, and antioxidant properties to create clean beauty products for environmentally conscious consumers.

Inclusivity of Regional Feedstock:

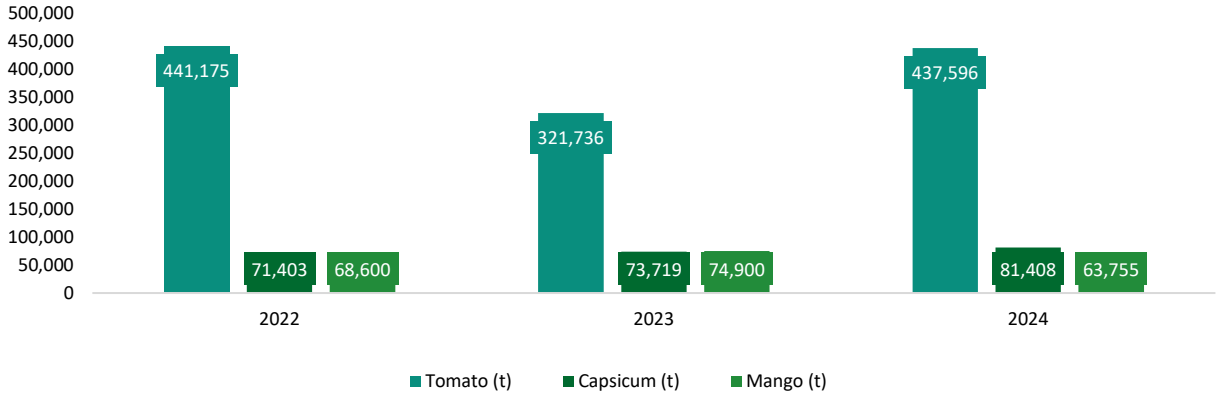
As freeze-drying and bioactive compound extraction both utilise tomatoes and capsicums primarily—two largely grown commodities in the region that generate a substantial amount of waste—Queensland alone produced 49,847 tonnes of tomatoes and 43,411 tonnes of capsicums in 2024. If a conservative waste estimate of 20% is applied to these figures, Queensland alone (of which BGGA produced the majority) is projecting 9,969.4 tonnes of tomato waste and 8,682.2 tonnes of capsicum waste per annum.

The primary feedstock for the facility—tomatoes, capsicums, and mangos—were chosen based on two main factors: high availability and proven success in precursor research.

As outlined above, the extraction of bioactive compounds and freeze-drying are the core focuses of the facility. Consequently, tomatoes, capsicums, and mangos were chosen as the main inputs due to their **abundance** and **established efficacy in previous research**.

There is a significant production of tomatoes, capsicums, and mangoes in Queensland, specifically in the Bowen-Gumlu region. As represented in Figure 7, Queensland's share of the national production includes 49,847 tonnes of tomatoes (11.4%), 43,411 tonnes of capsicums (53.3%), and 29,114 tonnes of mangoes (45.7%) in 2024.

Figure 6: Australian Production of Tomatoes, Capsicums and Mangos in 2024 (t)

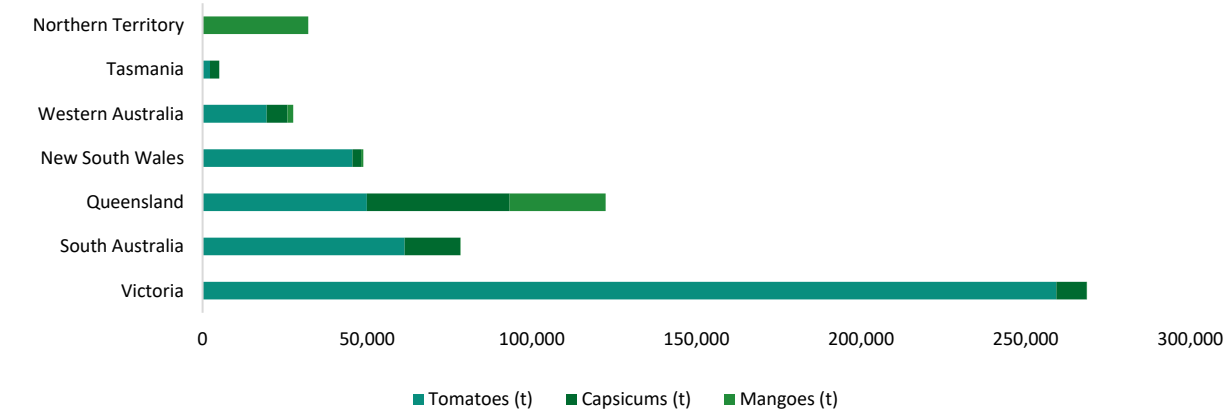


***Source**: Australian Horticulture Statistics Handbook 2023/24*

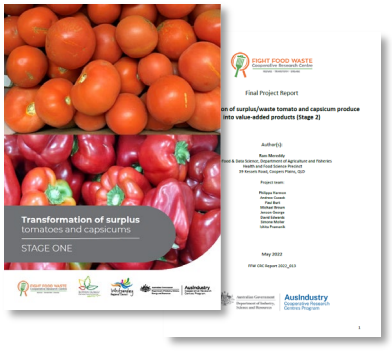
The Bowen-Gumlu region generates roughly AU$190 million in tomatoes and AU$77 million in capsicums. In 2024, this would represent approximately 31.67% of Australia's tomato market value and 32.49% of the national capsicum market value.

Applying a conservative waste estimate of 20% to Queensland's 2024 production figures, approximately 9,969 tonnes of tomatoes, 8,682 tonnes of capsicums, and 5,823 tonnes of mangoes would be lost. In the Bowen-Gumlu region, one tomato farm reported 10% of their 8,000-tonne production as rejected, with an additional 800 tonnes left in the field. Another farm indicated that up to 30% of their 9,000-tonne yield was left in the field.

Figure 7: Production of Tomatoes, Capsicums and Mangos by State in 2024 (t)



***Source**: Australian Horticulture Statistics Handbook 2023/24*



Prior studies conducted for Fight Food Waste Australia, authored by Dr. Ram Mereddy from the Queensland Government in May 2022, focused on the "Transformation of surplus/waste tomato and capsicum produce into value-added products." These studies successfully proved the concept of processing methodologies, producing dried tomato and capsicum products (freeze-drying) on a pilot scale, and trialling lycopene and β-carotene extraction methods (bioactive compound extraction) on a laboratory scale. This research provides proven, region-specific data on the nutraceutical content of freeze-dried powders, pieces and lycopene and β-carotene extracts.

This study, coupled with the abundance of stable feedstock, acted as the basis for tomatoes, capsicums, and mangos to be the main inputs for bioactive compound extraction and freeze-dried pieces and powder.

Product Market Analysis and Outlook

The proposed products produced at the facility show strong market growth, driven by dietary trends, ease of access, and the adoption of clean labels.

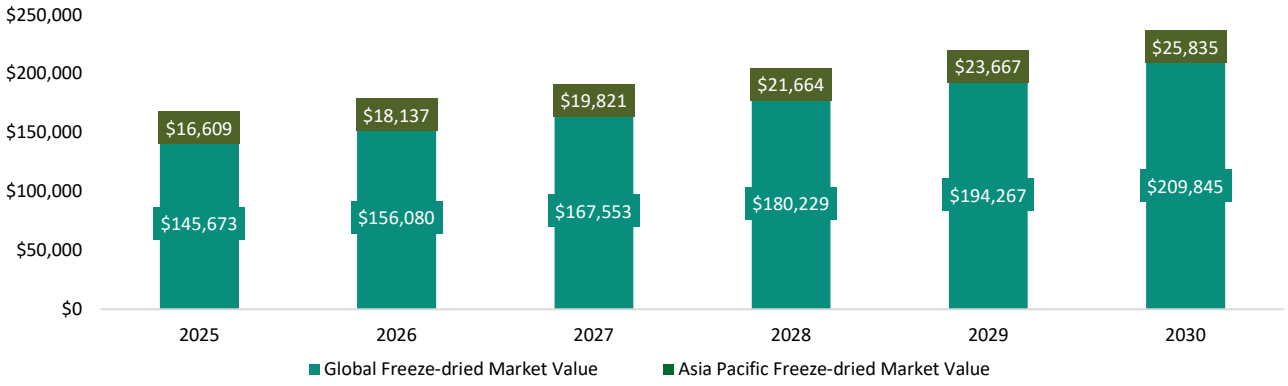
Freeze-dried Pieces

Key Insights

- The global freeze-dried fruits and vegetables market was valued at AU$12.7 billion in 2023 and is projected to grow to AU$23.1 billion by 2032, with a CAGR of 6.86% from 2024 to 2032.[44,†]
- Europe leads the market, holding a share of 93.4% in 2023.[45]
- The post-COVID-19 shift towards healthier food options in Australia presents a significant market opportunity for the facility due to increased health awareness.

Both the global and Australian freeze-dried pieces market offer opportunities in size and growth. The global freeze-dried fruits and vegetables market size was valued at AU$12.7 billion in 2023 and is projected to grow from AU$13.6 billion in 2024 to AU$23.1 billion by 2032, exhibiting a CAGR of 6.9% during the forecast period.[46,†] Europe holds a market share of 93.4% in 2023.[47] The Australian dried fruits market is projected to grow from AU$139.3 million in 2023 to an estimated AU$238.8 million by 2032, with a CAGR of 6.1% from 2024 to 2032.[48,†] Frisp, a key producer and retailer of freeze-dried pieces, has seen a spike in sales, increasing roughly 30% in 2024, with the company confident that a 40% growth rate is achievable in 2025.[49] Key end sales channels for freeze-dried pieces include retail, such as Woolworths, Coles, Frisp, Forager Foods, food service, e-commerce, and food manufacturers.

Figure 8: Projected Growth of Global Freeze-dried Market and Asia Pacific Freeze-dried Market (AU$ Hundreds of Thousands)[50, 51,†]



Freeze-dried pieces show clear market trends which the Bowen Food Futures Precinct will look to capitalise on in order to penetrate the domestic market. These trends include:

***Increasing Health Consciousness**: Consumers are prioritising health, leading to a surge in demand for organic and non-GMO freeze-dried fruits and vegetables. This is evident as 93% of Australians are willing to spend more on healthier options, despite 51% of Australians believing that eating healthily is expensive.[52]*

***Growth in Plant-Based Diets**: As of 2024, 15% of Australians were on a vegetarian or vegan diet, compared to 12.1% of the population in 2018, 11.2% in 2016 and 9.6% in 2012.[53, 54] This rise in vegetarian, vegan, and flexitarian diets may increase the demand for the Precinct's offerings as it boosts the consumption of freeze-dried fruits and vegetables as a convenient snack.*

***Adoption of Clean Labels**: With 68% of United States consumers indicating a preference for products with clearer labelling and fewer ingredients, there is a growing demand for clean-label products free from artificial additives, enhancing the appeal of freeze-dried fruits and vegetables, as they meet consumer demands.[55]*

***Increasing Demand for Convenience Foods**: Australian consumers have increased their consumption of convenience foods such as Freeze-dried fruits and vegetables by 9% in 2024 compared to pre-COVID levels in 2019, driven by time-constrained lifestyles and increased levels of urbanisation.[56]*

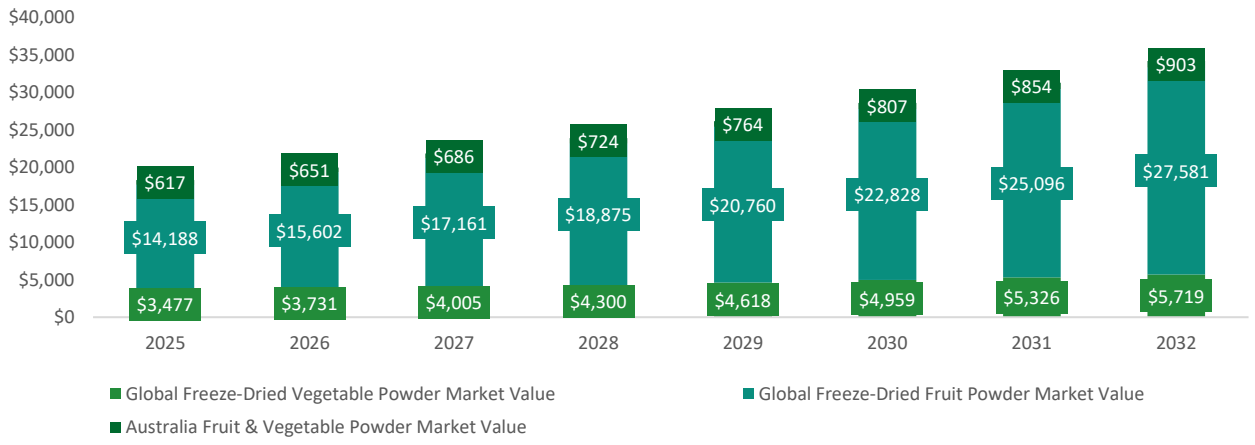
Freeze-dried Powders

Key Insights

- The global freeze-dried vegetable market is projected to reach AU$6.1 billion by 2033, while the fruit powder market is set to reach AU$27.3 billion by 2032. [57,†]
- The global freeze-dried vegetable powder market is exhibiting strong growth, driven by opportunities in convenience foods like ready-to-cook (RTC) meals.
- Key growth areas for the facility to capitalise on include infant foods, plant-based functional foods, beverages and dietary supplements.

The global freeze-dried vegetable powder market is projected to reach AU$6.1 billion by 2033, expanding at a CAGR of 7.3% from 2025 to 2033. [58,†] Concurrently, the global freeze-dried fruit powder market, valued at AU$10.7 billion in 2022, is expected to grow from AU$11.6 billion in 2023 to AU$27.3 billion by 2032. [59,†] In Australia, growth in the fruit and vegetable powders is leading to market demand opportunity, driven by freeze-drying and spray-drying techniques. The Australian fruit and vegetable powders market is projected to increase from AU$556.6 million in 2023 to AU$901.5 million by 2032, with a CAGR of 5.4%. [60,†]

Figure 9: Projected Growth of Global Freeze-Dried Vegetable and Fruit Powder Markets, and Australian Freeze-Dried Fruit & Vegetable Powder Market (AU$ Millions) [61, 62,†]



Similar market trends for freeze-dried pieces, as seen in powders, indicate strong market potential. The facility's market penetration will aim to capitalise on the following trends:

Reducing Food Waste and Increasing Vegetable Intake: *The facility can capitalise on the trend of low fresh vegetable intake by offering freeze-dried powders as a convenient alternative. This opportunity is underscored by recent launches from Coles and NutriV to help Australians meet their vegetable intake, a goal currently achieved by only 10% of the population.* [63]

Rising Demand for RTC Foods: *Overall, the revenue of Australian prepared meals production is expected to increase at an annualised rate of 1.1% over the five years through 2024-25, reaching AU$1.9 billion.* [64] *This includes an anticipated revenue rise of 1.8% in 2025, driven by the increasingly time-poor urban population in Australia.* [65] *Tomato and capsicum powders are key inputs in these meals.* [66]

Popularity of Clean Label Powders: *A recent survey showed that nearly 60% of consumers in Asia consider clean labels important; significantly influencing their purchasing decisions of fruit and vegetable powders towards freeze-dried and comparable products.* [67] *Additionally, Australia experienced a 15% increase in certifications for clean-label products.* [68]

Foodservice Sector Growth due to Product Development: *The increasing demand from the food service segment for ingredients such as freeze-dried vegetable powders offer channel opportunities. Products produced at the Precinct can be utilised to enhance the flavour and nutrient content of soups, sauces, and gravies without adding moisture.*

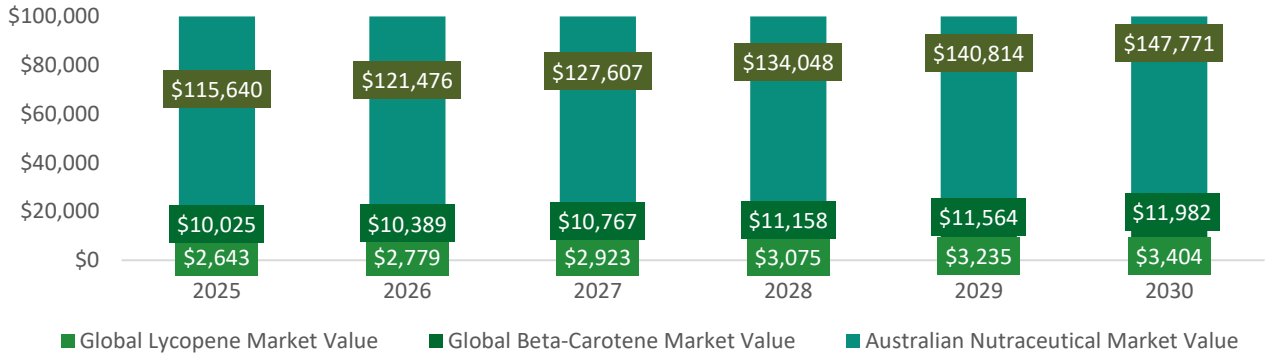
Extracted Bioactive Compounds

Key Insights

- The global lycopene market was valued at AU$239.0 million in 2023 and is projected to reach AU$375.3 million by 2032, growing at a CAGR of 5.1%[69,†]
- The β-carotene market size is estimated at AU$1.0 billion in 2025 and is expected to reach AU$1.2 billion by 2030, at a CAGR of 3.6%.[70,†]
- Rising health awareness and advancements in extraction methods are driving demand for natural antioxidants like lycopene and β-carotene, offering a growing market for the facility.

Driven by rising demand for functional foods and dietary supplements, the global bioactive ingredients market is set to reach AU$700.5 billion by 2035.[71,†] The global lycopene market, valued at AU$239.0 million in 2023, is projected to grow to AU$375.2 million by 2032, with a CAGR of 5.1%.[72,†] B-carotene is forecasted to increase from AU$1.0 billion in 2025 to AU$1.2 billion by 2030, at a CAGR of 3.6%.[73,†] The Australian nutraceutical market, of which lycopene and β-carotene are inputted, is estimated to grow from AU$11.6 to AU$14.8 billion from 2025 to 2030, a CAGR of 5.0%.[74,†] The market potential is highlighted by AgriFutures' and CSIRO's project to identify Australian agriculture sub-sectors for bioactives, targeting the AU$5.5 billion nutraceutical industry, which currently imports 90% of its ingredients.[75]

Figure 10: Projected Market Values for Lycopene, B-Carotene, and the Australian Nutraceutical Market (AU$ Hundreds of Thousands)[76, 77, 78,†]



Lycopene and β-carotene production is showing opportunity in the growth of the nutraceutical and supplement market, with the following trends key in capitalising on the market:

Rising Nutraceuticals and Dietary Supplement Demand: *Increasing consumer awareness and heightened health care costs are driving antioxidant demand, showing key channel options for lycopene and β-carotene, antioxidants that help reduce oxidative stress and the risk of chronic illnesses. Middle-aged Australians are a key focus market as the demographic increasingly focuses on diet health, with consumers aged 35 and above buying vitamins and supplements more than those under 25.*[79]

Rising Aging Population: *The market is also seeing a surge in products specifically targeting the elderly demographic, focusing on the health and well-being of the geriatric population. The ageing population, particularly those over 60, often contends with deficiency-related diseases.*[80] *Key health categories capturing manufacturers' attention, such as bone and joint support, calcium supplements, memory and brain health, and eye health supplements, offer potential for the precinct's products to investigate, test, and capitalise on these desired qualities.*

Technological Advancements: *Advances in extraction technologies, like supercritical CO_2 extraction, are boosting the efficiency and yield of lycopene and β-carotene production. This is driving greater industry adoption of these products and further research by AgriFutures and CSIRO into opportunities.*

Food and Beverage Industry: *B-carotene has historically been Australia's main carotenoid, crucial as a natural colourant in the food and beverage industry. With growing consumer demand for clean labels and natural products, β-carotene usage is set to rise, positioning the Bowen Food Futures Precinct to meet this demand with Australian-produced and manufactured goods.*

International Exports and the Asian Market

Leveraging the Asian market demand for antioxidants boosts export potential for bioactive compounds, providing further financial incentives as the facility scales up.

Key Insights

- The Chinese health supplements market grew from AU$31.5 billion in 2015 to AU$54.8 billion in 2019, with 60% of consumers having purchased imported supplements, primarily from Australia, New Zealand, Canada and the US.[81,†]
- The nutraceutical dietary supplement market in India is expanding rapidly due to increasing awareness of antioxidants and a general demand for healthcare products.
- Japan's ageing population is driving demand for antioxidants like β-carotene and lycopene, though domestic production remains limited due to international competition.

The nutraceutical markets in Asia, particularly in Japan, China, Indonesia, Malaysia, and Singapore, are experiencing substantial growth, driven by increasing consumer demand for health benefits like antioxidants such as β-carotene. As production facilities scale appropriately, exports could become a key avenue, capitalising on the rising demand in these key trading partner countries.

China	China is seeing an increase in interest in antioxidants, with trusted international brands dominating the market. According to a study by the Chinese Nutrition Society, 60% of respondents reported purchasing imported supplements. The four most popular countries for Chinese consumers are Australia, New Zealand, Canada and the USA. [82] In 2015, China's health supplements market was worth AU$31.5 billion.[83,†] By 2019, China had become the world's second-largest consumer of healthcare products after the US, with annual revenues of AU$54.8 billion.[84,†] China's increased focus on antioxidants is boosting interest in carotenoids such as β-carotene. The Chinese market is competitive, with concerns over intellectual property and product duplication. **However, given China's favourable perception of Australian products and strong trade connections, China could potentially become a vital export market as facilities expand internationally.**
India	The nutraceutical and dietary supplement market in India is expanding rapidly due to increasing awareness of antioxidants and a general demand for healthcare products since the pandemic. B-carotene is the largest segment in the domestic market, primarily used in beverages and juices. India's nutraceutical market is poised to grow to approximately AU$27.9 billion by 2025.[85,†] The dietary supplements market, valued at AU$6.1 billion in 2020, is expected to reach AU$15.8 billion by 2026, with a 22% annual growth rate.[86,†] ***Strict trade tariffs and regulations may hinder access to the Indian market. However, India's rapid urbanisation and growing middle class suggest it could still become a key export partner for the precinct.***
Japan	The Japanese dietary supplements market, valued at AU$4.8 billion in 2024, is projected to grow from AU$5.1 billion in 2025 to AU$8.1 billion by 2032, with a CAGR of 6.86%.[87,†] Japan's ageing population has a strong interest in the health benefits of antioxidants, boosting demand for carotenoids like β-carotene and lycopene. However, domestic production is limited due to the competitive international market, despite growing investments since 2020. ***Japan's health-conscious and ageing population drives demand for high-quality dietary supplements and offers an opportunity for Australian exports of lycopene and β-carotene.***
South Korea	By 2030, it is anticipated that the South Korean nutrition and supplements market will reach a value of AU$17.9 billion from AU$8.6 billion in 2022, growing at a CAGR of 9.5% during 2022-2030.[88,†] ***Similar to Japan, demand for high-quality dietary supplements could offer an opportunity for export.***

Europe and North America limit export potential; however, growing urban Asian markets with increasing incomes offer opportunities for freeze-dried products.

Key Insights

- High freight costs and existing comparable domestic production facilities reduce the feasibility of Australian freeze-dried product exports to North America.
- Europe's advanced production capabilities and established infrastructure make it challenging for Australian producers to compete in the market.
- The Asia-Pacific region is poised for high growth in the freeze-dried fruits and vegetables market, driven by increasing urbanisation and shifting consumer preferences.

North America

High freight costs and existing comparable domestic production facilities reduce the feasibility of Australian freeze-dried product exports to North America. Despite the rising demand for healthy, convenient food options, with fruit and vegetable consumption in North America growing from 144 million tonnes in 2019 to 148.48 million tonnes in 2021, these **logistical and competitive challenges make penetrating this market less viable for Australian producers**.[89]

Europe

Europe is the largest market for freeze-dried fruits and vegetables, driven by a shift toward healthier and more sustainable diets. Consumers are increasingly incorporating freeze-dried products into meals, snacks, and as ingredients in the food industry. The region's preference for products with extended shelf life and a growing population of health-conscious and vegan consumers drives the market. Europe's advanced production capabilities and established infrastructure make it a strong competitor in meeting global demand. **Consequently, it would be challenging for Australian producers to establish a substantial foothold in this market.**

Asia-Pacific: A Growth Prospect

The Asia-Pacific region is expected to experience high growth in the freeze-dried fruits and vegetables market. Increasing urbanisation and shifting consumer preferences toward nutritious and convenient food options drive the demand for premium products. **Countries with rising per capita income, driven by economic development and a focus on health-conscious lifestyles, offer export potential for the Bowen Food Futures Precinct.**

While Australia's current position in the freeze-dried product market may be overshadowed by Europe's production capabilities, the growing demand in Asia provides a pathway for the future expansion of the facility.

By focusing on emerging markets, particularly in regions undergoing economic growth and urbanisation, the Bowen Food Futures Precinct could potentially access the niche Asian market for freeze-dried products.

Competitor and Supplier Market Analysis

The Australian markets for freeze-dried fruits and vegetables, as well as bioactive compounds, are characterised by evolving consumer demand and significant to moderate market fragmentation. Both industries share similar consumer demand drivers and buying segments, notably health-conscious individuals and middle-aged to elderly individuals who seek health benefits through clean label products.

Figure 11: Freeze-dried and Bioactive Compound Market Characteristics

	Freeze-dried Fruit and Vegetable Market		Bioactive Compound Market	
Fragmentation		Highly fragmented, with primarily small to medium-sized enterprises.		Moderately consolidated, with a few leading companies and several research institutions.
Concentration		No single player dominates the sector.		Leading companies such as MediHerb and Blackmores hold significant market shares.
International Presence		Major international companies have a minimal footprint in Australia.		Strong competition from international entities, especially from Europe and North America.

Note: Grey shaded icons indicate a low level of the market attribute, while red indicates high levels.

Freeze-dried Fruit and Vegetables - Buying Segments	Bioactive Compounds - Buying Segments
• **Middle-Aged and Elderly**: 35+ age group purchasing more supplements.[90]	• **Health-Conscious Consumers**: 93% willing to spend more on healthier options.[91]
• **Health-Conscious Individuals**: Rising demand for antioxidants.	• **Vegetarian/Vegan Consumers**: 15% of Australians on plant-based diets in 2024.[92]
• **Healthcare & Wellness**: Utilised in hospitals and wellness centres.	• **Urban Dwellers/Busy Professionals**: Driven by convenience and time constraints.
• **Food & Beverage Manufacturers**: Use natural colourants like β-carotene.	• **Foodservice Providers**: Ingredients for soups, sauces, and RTC meals.

Freeze-Dried Fruit and Vegetables - Consumer Demand	Bioactive Compounds - Consumer Demand
• **Functionality & Health Benefits**: Antioxidants reduce oxidative stress.	• **Health & Wellness**: Demand for nutritious snack alternatives.
• **Clean Label & Natural Ingredients**: Preference for fewer additives.	• **Convenience**: 9% increase in convenience foods consumption from pre-COVID levels in 2019.[93]
• **Convenience**: Easily accessible health supplements.	• **Plant-Based Diets**: Boost in freeze-dried fruits and vegetables consumption.
• **Geriatric Care**: Products targeting bone, joint, memory, and eye health supplements.	• **Clean Label & Transparency**: 68% of US consumers prefer products with clear labels.[94]

Freeze-dried Competitor and Supplier Market Analysis

The freeze-dried fruits and vegetables industry in Australia is fragmented, primarily consisting of small to medium-sized enterprises such as Forager and Frisp. No single player dominates this sector in Australia, yet high competition does exist within Australia. Major international companies do not have a significant footprint in the Australian freeze-dried sector.

The limited presence of international companies allows local manufacturers to potentially compete effectively on a smaller scale. Despite high domestic competition, the growing market offers potential expansion opportunities for local enterprises.

Bioactive Compounds Competitor and Supplier Market Analysis

In the bioactive compounds sector, the landscape is moderately consolidated, with a few leading companies, such as MediHerb and Blackmores. This sector faces strong competition from international companies, particularly from Europe and North America. The market is seeing a steady entry of new participants and substantial capital investment in this sector.

The Australian complementary medicine industry, into which lycopene and β-carotene could be inputted, has seen consistent growth driven by strong domestic and international demand, reaching AU$5.5 billion in revenue in 2021.[95] Despite the supply chain challenges posed by the COVID-19 pandemic, the industry maintained an annual growth rate of 1.4%.[96] In Australia, products such as herbs, vitamins, minerals, nutritional supplements, homoeopathic remedies and certain aromatherapy preparations are categorised as 'complementary medicines.' These products are regulated as medicines under the Therapeutic Goods Act of 1989.

The Australian vitamins and dietary supplements industry, which is another key input avenue for lycopene and β-carotene and is closely related to the complementary medicine market, was valued at AU$1.5 billion in 2022.[97] This industry is highly competitive and is forecasted to grow at an annual rate of 3.4%, driven by increased interest in health and wellbeing.[98] Leading brands such as Blackmores, Swisse, and Nature's Way are prominent, generating AU$288 million, AU$81.3 million, and AU$97.4 million in 2021-2022 in the Australia-New Zealand market, respectively.[99] Emerging brands like Kynd, FijiKava, and JSHealth are also gaining traction. While vitamin D, vitamin C, and multivitamins remain the most popular products, consumer preferences are influenced primarily by price and brand reputation. Significant trends include products targeting women's health, beauty-from-within supplements, sleep and stress relief, and muscle support. Consumers increasingly demand scientific validation, sustainability, vegan-friendly ingredients, and "free-from" labelling, with rising interest in immunity support, hormonal balance, and non-pill supplement forms such as gummies and balls.

The **Australian complementary medicine industry** and **dietary supplement industry** heavily depend on international supply chains, with approximately 90% of nutraceutical ingredients being imported.[100]

This opens opportunities for local production facilities like the Bowen Food Futures Precinct, which could supply onshore companies and reduce reliance on imports, potentially lowering costs associated with imports.

Barriers to Enter the Freeze-Drying and Bioactive Compound Extraction Industries

Key Insights

- High upfront capital costs and the need for advanced machinery limit entry to the freeze-dried and bioactive compound industry. Super Critical Fluid extraction, the process utilised for bioactive compound extraction within the Bowen Food Futures Precinct has a significantly high capital cost yet has minimal operating fees.
- Strict regulatory guidelines and necessary certifications such as FSANZ compliance, HACCP, and GMP play a critical role in maintaining food safety and consumer trust while fostering international trade opportunities.

High Input and Upfront Capital Costs

Input costs and wages are the largest ongoing expenses for both the bioactive compound extraction and freeze-drying industries. Wage costs have increased significantly over the past five years, leading large producers to enhance automation. Forager's two new state-of-the-art freeze-dryers have increased processing capacity to 4,490 tonnes of wet product per annum—an 8-fold increase. [101] However, these purchases are the largest costs for industry operators.

The freeze-dried and bioactive compound industry has moderate to high capital intensity, with costs varying based on the extraction process. For example, supercritical fluid extraction has high upfront costs but lower operating costs. Most industry operations, including freeze-drying and packaging, use capital-intensive automated machinery. For more information on machinery costs and inputs, see Figure 54: Capex Timeline Summary within Financial Projections.

High Level of Regulations

The Australian freeze-dried and bioactive compound industry is affected by heavy regulation and policy, similar to many other nutraceutical and food industries. Federal laws govern much of the legislation relating to food manufacturing, with individual states governing related policies.

The Food Standards Australia New Zealand (FSANZ) establishes strict guidelines on food safety, labelling, contaminants, and additives which operators must adhere to.

Additionally, compliance with Hazard Analysis and Critical Control Points (HACCP) is critical for ensuring food safety through the analysis and control of biological, chemical, and physical hazards. Good Manufacturing Practices (GMP) ensure that products are consistently produced and controlled according to quality standards. ISO 22000 specifies the requirements for a food safety management system, involving the entire supply chain.

It will be vital to manage rising input and wage costs while complying with necessary regulations in both the bioactive compound extraction and freeze-drying industries.

- High input costs will be managed using supplier relationships and offtake agreements as outlined in Producer Willingness, Supplier Conditions and Offtake Agreements section, within Operating Plan.
- Staff will be managed by maintaining a lean and small team, reducing overhead costs, as outlined in the Personnel section, within Operating Plan.
- Compliance with regulations will be ensured through annual reviews and a staggered gate approach to meet necessary prerequisites, detailed in the Compliance and Regulations section, within Operating Plan.

GO TO MARKET STRATEGY

The market growth in the Market Analysis section justifies the Precinct's phased approach to expanding market reach by aligning plans with targeted channels and services.

The strong market growth observed in the Market Analysis and Outlook section provides a compelling justification for our multi-phased approach to entering various sales channels and services for our proposed product lines. Our strategy is designed to establish a solid operational foundation before expanding into broader retail and export markets, ensuring steady growth and market penetration.

Figure 12: Freeze-dried Mango Pieces Product Channel/Value Chain

Co-packer: Bulk product can be supplied to co-packers, who can handle retail-ready packaging and distribution through existing retail relationships, enabling quicker market entry with minimal setup time.

Retailer: Packaged product can be supplied directly to retailers, offering the potential for higher margins. However, this approach requires establishing a customer network, securing agreements, and managing distribution logistics, which can be time intensive. Additionally, major retailers operate within fixed category review cycles and product reset periods, posing further challenges to market entry.

Export: Exporting bulk product directly from the processing facility offers access to international markets and potential volume growth and diversification. However, it requires navigating export regulations, securing reliable trade partners, and managing logistics, including freight and customs clearance.

Figure 13: Tomato Powder & Capsicum Powder Product Channel/Value Chain

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Ingredient House: Bulk product can be supplied to ingredient houses, who act as an intermediary by sourcing bulk ingredients, storing them, and supply food manufacturers or foodservice as needed. This pathway offers relatively quick market entry without needing to secure individual manufacturer contracts, reducing sales complexity and speeding up initial market access.

Food Manufacturer: Powders can be supplied directly to food manufacturers, who incorporate the product into sauces, seasonings, snacks etc. This pathway can offer better margins, however, requires effort in building a sales network, negotiating contracts, and/or meeting procurement cycles.

Export: Bulk product can be supplied to international markets, where buyers may distribute it to ingredient suppliers or food manufacturers in-market. This enables potential to scale volume, however, involves additional challenges, including regulatory compliance, logistics, and international negotiations.

Figure 14: Lycopene & β-Carotene Extracts Product Channel/Value Chain

Pharmaceutical Manufacturer: Supplying lycopene and β-carotene oils to pharmaceutical manufacturers allows them to be processed into gel capsules for health supplements. This pathway faces challenges in regard to securing contracts and compliance with strict regulatory and quality standards.

Export: Exporting products to global markets, where they may be sold to pharmaceutical companies for further processing, offers the potential for high-volume sales. However, it involves additional complexities such as international regulatory approvals, logistics, and securing reliable buyers.

Figure 15: Phased Approach Summary

Channel/Phase	Pilot Phase (FY27-28)	Small Scale Commercial Phase (FY29-30)	Large Scale Commercial Scale (FY31-36)
Freeze-dried Mango Pieces	Exclusively channel bulk product to co-packers.	Introduce the product directly to retail stores.	Expand presence in retail stores (nationwide distribution agreements). Commence international exports.
Tomato Powder & Capsicum Powder	Exclusively channel bulk product to ingredient houses.	Introduce the product directly to food manufacturers.	Build volumes to food manufacturers. Commence international exports.
Lycopene Oils & β-Carotene Oils	N/A	Exclusively channel bulk product to pharmaceutical manufacturers.	Commence international exports.

Channel Approach Per Product

Freeze-dried Mango Pieces:

- **Initial Phase (First Two Years)**: In the first two years, freeze-dried mango pieces will be sold exclusively to distributors and co-packers. This approach allows for establishing a stable operational base and securing necessary retail partnerships without the immediate pressure of direct retail sales.
- **Direct Retail Sales (FY29 Onwards):** Starting in FY29, direct sales to retailers will commence, initially accounting for 10% of total sales and gradually increasing to 50% by FY33. This move is supported by trends indicating heightened consumer health awareness post-COVID-19 and increasing adoption of convenience foods.
- **Exports (FY31 Onwards):** Exports will be introduced in FY31, with export sales projected to grow to 20% of total sales by FY33. This approach aligns with opportunities in international markets, particularly in Asia-Pacific, where consumer demand for health-conscious and convenient food options is increasing.

Freeze-dried Tomato/Capsicum Powder

- **Initial Phase (First Two Years)**: Sales of tomato/capsicum powder will begin with ingredient houses, capitalising on the projected growth in the freeze-dried vegetable powder market, with the global market set to reach AU$6.1 billion by 2033.[102] This initial focus allows for the stabilisation of operations while meeting market demand driven by the popularity of RTC foods.
- **Direct Sales to Food Manufacturers (FY29 Onwards)**: As operations stabilise, sales to food manufacturers will commence, initially accounting for 10% of total sales and increasing to 30% by FY33. The market for Australian-prepared meals is also expected to grow, reaching AU$1.9 billion by 2025, leading to growth in food manufacturing input needs.[103]
- **Exports (FY31 Onwards)**: Exports will commence in FY31, with export sales expected to grow to 20% of total sales by FY33. The rising demand for high-quality, natural food ingredients in Asian markets presents significant opportunities. Japan's dietary supplements market, projected to grow from AU$5.1 billion in 2025 to AU$8.1 billion by 2032, highlights the potential for exports.[104]

Lycopene & B-Carotene

- **Commencement of Extraction (FY30 Onwards)**: Bioactive compound extraction is anticipated to commence in FY30, contingent on achieving key milestones. Initial sales will focus on pharmaceutical manufacturers domestically. The Australian nutraceutical market is estimated to grow from AU$11.6 billion to AU$14.8 billion from 2025 to 2030, a CAGR of 5.04%.[105]
- **Exports (FY32 Onwards)**: Export sales will begin in FY32, growing to 20% of total sales by FY34. The robust growth in the global bioactive ingredients market, which is expected to reach AU$700.5 billion by 2035, particularly in Asian markets, aligns with the expansion strategy.[106] China's preference for imported health supplements and Japan's ageing population's demand for antioxidants further support the potential for lycopene and β-carotene exports.

OPERATING PLAN

The facility's operating plan provides a detailed roadmap that aligns with the strategic plan, ensuring scalable operations and opportunities for growth.

Design Principles

The design principles underpin the business case and operations plan, guiding decisions and trade-offs in evaluating the operating structure and model for the facility. All design principles are weighted equally and are key considerations in the decision-making process. The principles reflect the decision to implement a staged approach, production capacity, feedstock, and process selection.

Figure 16: Design Principles

Design Principles in the Creation of the Bowen Food Futures Precinct				
Multi-Commodity Inclusivity:	**Scalability and MVP Volume Balance:**	**Grower Engagement and Returns:**	**Diversified Risk and Process Linkages:**	**Regional Branding:**
The end process should accommodate various commodities or have the ability to further accommodate commodities.	Maintain appropriate process and facility scale, aligning with committed material volumes and proven market demand, ensuring demand-driven scalability.	Ensure commercial arrangements and governance structures foster grower commitment and profitability, encouraging ongoing product supply.	Adopt a process that connects to multiple end uses, diversifying risk with pre-processing principles and multiple streams.	Leverage the region's brand to gain market advantage and recognition.

Core Considerations Derived from the Design Principles

There are three major considerations which should be adopted within the operating structure of the Precinct.

Figure 17: Core Operational Framework

Core Operational Framework		
Ensuring a stable and high-quality supply of feedstock is crucial for the Precinct's ongoing operations and meeting market demands.	**Adopting a phased approach to scale ensures incremental investment aligned with demand, reducing risks and maintaining operational flexibility.**	**Remaining market-driven ensures that operations align with consumer demands, enhancing profitability and market position.**
Producer Willingness and Supply Agreements: *Engage with local producers through transparent communication and mutual benefits to secure long-term supply agreements, encouraging sustainable practices and providing financial stability.*	***Pilot Scale to Large Scale Commercial Operations:*** *Beginning with a pilot scale to test processes and address operational challenges before scaling up to small and then large-scale throughput, ensuring a controlled growth trajectory.*	***Demand-Driven Approach to Operations:*** *Conduct a thorough market analysis to understand customer needs and align production schedules and scaling decisions with proven market demand.*

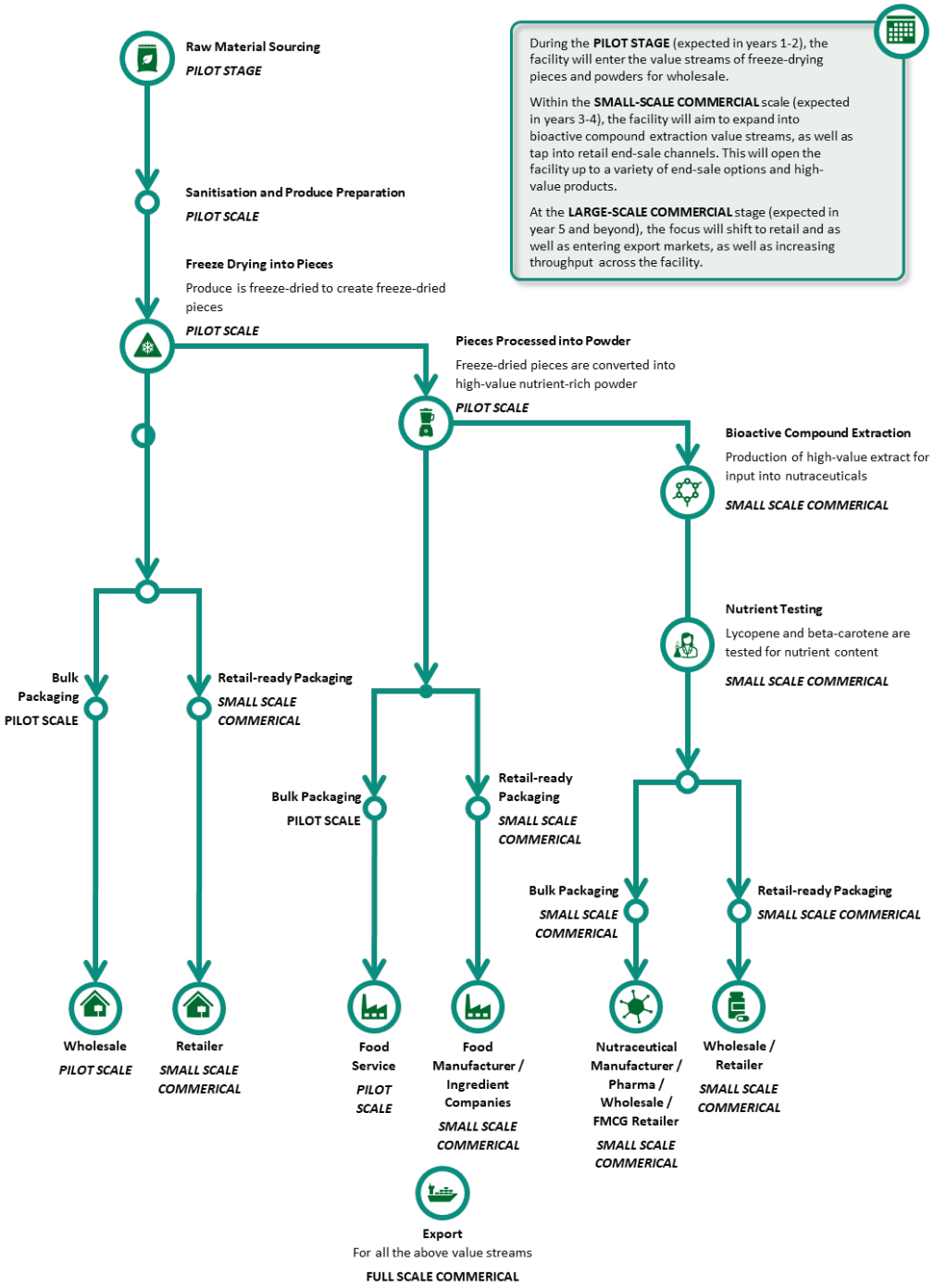
Detailed Outline of Facility Operations

Scaling of the Facility

The facility will be structured to support a phased approach to scaling operations. Initial efforts will focus on establishing a baseline with a pilot stage, then gradually moving to small-scale commercial operations, and finally scaling up to large-scale commercial operations, contingent upon meeting specific criteria (stage gates).

This phased approach ensures that each stage of development builds on the success and learnings of the previous stage, allowing for incremental investments and adjustments as necessary. This method will help counteract market uncertainties, enabling the site to pivot as needed in its production of individual products. If certain products demonstrate strong market penetration and access, or if demand drops, the facility can adjust accordingly.

Figure 18: Facility Value Chains and Associated Scales



Phased Approach Justification

The phased entry strategy for various sales channels and services effectively **aligns with identified market trends and growth potential**. The gradual sustainable growth approach provides the facility time to optimise products and machinery, ensuring that the facility has time to achieve peak efficiency before scaling up operations.

By initially focusing on less barrier channels and production, such as the creation of pieces and powder for wholesale and ingredient manufacturers, the facility is afforded the time to incubate and establish clear supply lines for feedstock and output.

Once the facility is well-established and has optimised its operations, more complex processes and channels can be entered. This includes bioactive compound extraction (e.g., lycopene and β-carotene) and expanding into direct retail and export markets. Gradually expanding to retail and export sales taps into the growth in health-conscious and convenience-oriented consumer segments.

Stage-Gate Approach

The facility's growth will be managed through a stage gate approach, incorporating annual review programs to assess readiness for the next stage. Discussions for transitioning to Stage 2 (small-scale commercial) and Stage 3 (large-scale commercial) will begin 18 months prior to the intended transition date, ensuring that prerequisites are met and the facility is prepared for the next level of operations.

These stage gates serve as crucial checkpoints, enabling the facility to reassess strategies, refine processes, and ensure that all regulatory and operational standards are maintained. For further information on the exact financial prerequisites required, please see the Stage Gates and Milestone Scaling – Capital Expenditure section within Financial Projections.

Pilot Scale – 2-year Duration – FY27 – FY28

The pilot stage will optimise methodologies for producing nutrient-rich powders and pieces from mango, tomato and capsicums, establishing the viability of these processes for future stages. **Core establishment components include:**

Figure 19: Pilot Scale Establishment Components

Component	Action Items
Secure Site	Identify and lease a suitable pilot facility site.
Facility Preparation	Renovate and prepare the facility for pilot operations.
Equipment Procurement	Purchase and install the initial necessary equipment.
Initial Workforce Hiring	Recruit and train the initial workforce to manage pilot operations.
Documentation and SOPs	Develop standard operating procedures and detailed process documentation.
Initial Market Research	Conduct market research to identify potential demand and feedback channels.
Process Optimisation	Develop and refine processes for producing nutrient-rich powders and pieces.
Production Trials	Conduct trials to test processes with small-scale equipment and manual handling.
Quality Control	Establish and implement quality control protocols and systems.
Certifications and Training	Obtain required certifications; train operators on processing methodologies.
Supplier Agreements	Establish initial agreements with key suppliers for raw materials.
Waste Management Plan	Develop and implement a waste management plan for pilot operations.
Initial Sales Channels	Identify and set up initial sales channels for pilot produce.
Basic IT Systems	Implement basic IT infrastructure to support operations and data collection.

The Pilot Scale facility is designed to test the commercial production of the products outlined in the Business Case Overview section. In this stage, the facility will operate with a modest throughput of 100kg per day, relying heavily on manual labour. The focus will be on refining processes, ensuring quality control, and establishing baseline productivity. This stage will involve significant manual handling and smaller-scale equipment to manage the initial volume of produce. This phase will allow the facility to identify and address any operational challenges on a smaller scale before scaling up, thus minimising potential risks and ensuring a solid operational foundation. The insights gained from the pilot stage will be critical in informing decision-making processes for subsequent phases.

The rationale for the Pilot Scale Facility stage was supported by the precursor report conducted before the Business Case production. Authored by Dr. Ram Mereddy from the Queensland Government in May 2022 for Fight Food Waste Australia, the report titled "Transformation of surplus/waste tomato and capsicum produce into value-added products" emphasised the need for further optimisation of the process for producing lycopene and β-carotene-rich extracts from tomato and capsicum powders. **While the Pilot stage will not directly produce lycopene and β-carotene, it will optimise and establish the viability of the powders necessary for these end products. It will also allow the facility and its operators to obtain the required certifications and skills to process bioactive compounds.**

Small Scale Commercial – 2-year Duration – FY29 – FY30s

Transition from pilot scale to small-scale commercial operations, focusing on increasing throughput, efficiency, market penetration, and channel selection. **Core scale-up components include:**

Figure 20: Small Scale Commercial Establishment Components

Component	Action Items
Market Development	Identify and establish retail and wholesale market channels.
Supplier Network Expansion	Expand the supplier network to ensure consistent supply.
Throughput Increase	Purchase and install additional machinery to scale throughput.
Process Efficiency	Integrate semi-automated processes with manual labour for increased efficiency.
Equipment Procurement	Purchase and install necessary small-scale commercial equipment.
Retail Packaging Initiation	Set up and initiate basic consumer-ready packaging processes.
Bioactive Compound Extraction	Start extraction processes for bioactive compounds such as lycopene and β-carotene.
Handling and Transportation	Procure forklifts and semi-automated conveyance systems.
Workforce Expansion	Hire and train additional staff to support increased operations.
Advanced Quality Control	Enhance quality control measures with additional equipment and protocols.
IT Infrastructure Upgrade	Upgrade IT systems to support increased data needs and operational complexity.
Regulatory Compliance	Ensure compliance with all relevant food safety and processing regulations.
Customer Relationship Management	Set up systems to manage customer relationships and feedback.
Branding and Marketing	Develop and implement branding and marketing strategies for new products.
Financial Planning	Develop detailed financial plans to support scaling and capital investments.
Logistics and Distribution	Expand logistics capabilities to handle increased product volumes.
Cost Optimisation	Evaluate and implement improvements for cost efficiency.

As the facility moves to the small-scale commercial stage, throughput will increase by 600kg per day, totalling 700kg once fully operational. This stage will introduce more machinery to balance manual labour with mechanical processes to improve efficiency. Forklifts and semi-automated equipment may be necessary to handle the higher volume of produce. Bioactive compound extraction will be introduced at this stage.

This phase will also see the beginning of basic consumer-ready packaging processes, alongside existing bulk packaging for wholesale. The introduction of additional machinery and semi-automated processes will not only enhance productivity but also enable entry into additional market channels, which will enable the facility to meet higher demand and improve margins by optimising cost efficiency.

This stage will help transition the facility from pilot-scale and commissioning-focused to commercial-scale operations. The focus will shift to market penetration and channel selection, establishing clear pathways that can be further advanced as the facility scales. **This transition will be crucial in laying a solid foundation for long-term commercial success, ensuring that the facility can effectively compete in the marketplace and respond to evolving market demands.**

Large Scale Commercial – 5+ Year Duration – FY31 – FY36+

Expand distribution and reinforce supply chain partnerships to sustain long-term growth with advanced machinery and automation.
Core scale-up components include:

Figure 21: Large Scale Commercial Establishment Components

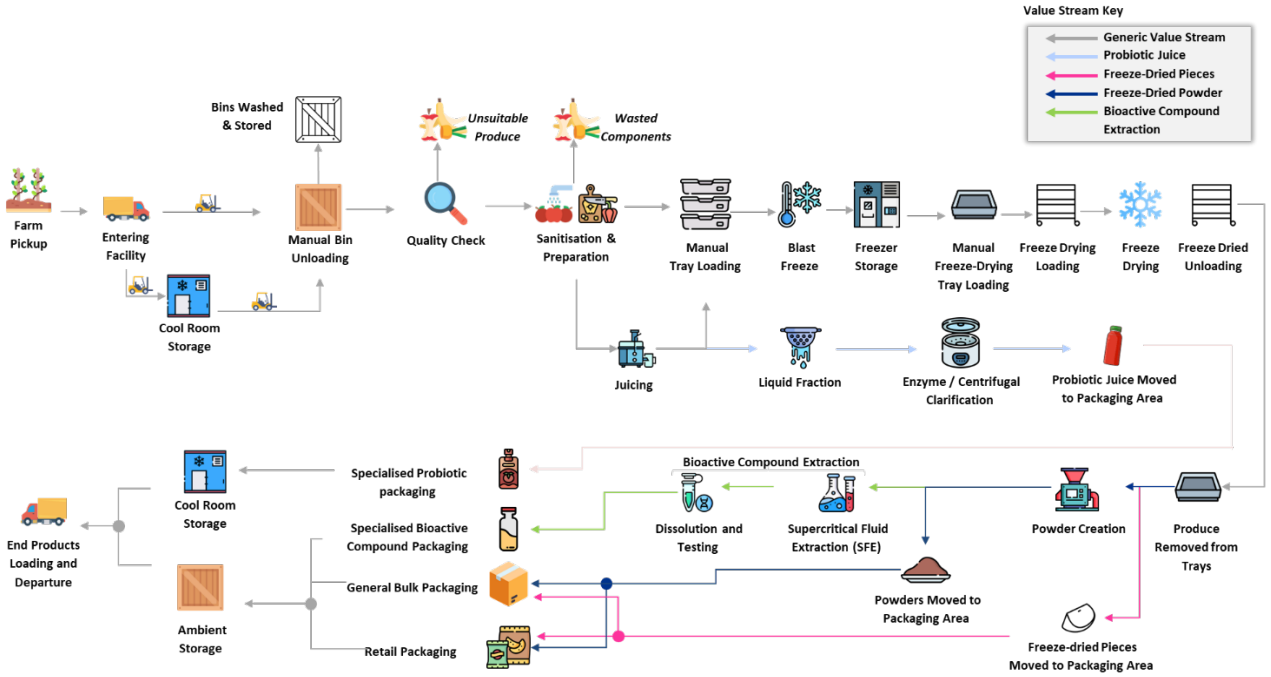
Component	Action Items
Strategic Planning	Develop a comprehensive strategy for large-scale expansion.
Supplier Agreements	Strengthen relationships with suppliers to ensure reliable supply.
Advanced Machinery Installation	Install advanced machinery to substantially increase throughput.
Full Automation	Implement fully automated packaging systems for wholesale and retail.
Workforce Expansion	Expand the workforce and provide advanced training programs.
Logistics Optimisation	Enhance logistics and transportation capabilities.
Regulatory Compliance	Ensure compliance with all relevant regulations.
Financial Planning	Develop detailed financial models to support large-scale operations.
IT Integration	Fully integrate IT systems for real-time data tracking and process management.
Quality Assurance	Implement advanced quality control systems and protocols.
Distribution Channel Expansion	Develop partnerships with distributors to widen market reach.
International Market Entry	Plan and execute strategies for entering international markets.
Innovation and R&D	Invest in research and development for continuous innovation.
Environmental Sustainability	Implement sustainable practices and technologies.
Customer Experience Enhancement	Develop programs to enhance customer experience.
Risk and Compliance Management	Expand risk management and compliance frameworks.
Performance Metrics and KPIs	Establish and monitor key performance indicators.
Product Diversification	Expand product lines to attract new market segments.
Corporate Social Responsibility	Develop and implement CSR initiatives.
Strategic Partnerships	Form alliances to support growth and innovation.

The large-scale commercial stage will involve a substantial increase in throughput with advanced machinery and automation to handle the volume efficiently. The throughput of this stage will increase by a further 1.8 tonnes per day, totalling 2.5 tonnes of wet produce per day. The facility will require forklifts and automated conveyance systems to move produce and reduce manual labour. Packaging processes will be fully automated, supporting both wholesale and retail packaging requirements with robust quality control systems in place. **The large-scale commercial scale of the facility will continue scaling as market demand and input volumes allow. This stage will also focus on expanding distribution channels and reinforcing supply chain partnerships to sustain long-term growth.**

Full Step-by-step Facility Process Flow

The Precinct will involve a variety of value streams and, hence, a variety of different steps within the plant. Additionally, the complete end-to-end process within the facility will evolve with structural changes and the addition of new value streams over time, increased throughput, and the incorporation of further sales channels.

Figure 22: Full Value Stream Process Flow of the Large-Scale Commercial Facility:



The proposed facility primarily consists of three main areas of operation:

- **Produce Entry and Preparation -** This is the stage where the raw produce is received and prepared for processing. The steps here include receiving, storing, sorting, washing, and inspecting tomatoes, capsicums, and mangoes to ensure quality and remove any unsuitable items. The produce is then cut or chopped as needed and stored under appropriate conditions to maintain freshness until it moves to the next stage.
- **Produce Processing -** This section encompasses the core processing activities. The steps here involve various extraction methods such as freeze-drying and or supercritical CO_2 extraction to obtain bioactive compounds like lycopene and β-carotene from the produce. The processing may also involve converting the produce into dried powders, purees, or other value-added forms. This stage transforms the raw produce into stable, high-quality products ready for packaging.
- **Packaging and Exit -** The final area is dedicated to packaging the processed products. The steps here include measuring, portioning, and packaging the dried powders, oils, or other extracted products into containers or packaging suitable for storage and transport. Quality assurance steps are conducted to ensure the products meet regulatory, nutritional and safety standards. Once packaged, the products are labelled and stored in this area until they are distributed or shipped to customers.

***Note** that these areas of operation may overlap and are not necessarily designated to one physical area; instead, they are general groupings of related and relevant activities.*

Compliance and Regulations

Annual food safety audits and offsite lab testing will be integral to the operations of the Bowen Food Futures Precinct. Accreditation costs, including NATA accreditation, will be managed on a rolling basis. When scaling the facility from pilot to small-scale commercial, and from small to large-scale commercial, accreditations and food safety audits will need to be applied for and obtained prior to each initial rollout, potentially 6 – 24 months prior, depending on the accreditation.

Figure 23: Bowen Food Futures Precinct compliance reviews:

Component	Core to Commission Facility	Prior to Small-Scale Rollout	Prior to Large-Scale Rollout	Annual	Every 2-5 Years	Core Processes	Regulations/ Requires Audit
Food Standards Code	Initial compliance with FSANZ standards.	Review compliance prior to rollout.	Review compliance prior to rollout.	Ongoing compliance review and audit.	-	Implementation and adherence.	Compliance reviews, potential audits.
Food Act 2006 (QLD)	Ensure compliance and obtain approvals.	Review compliance and approvals.	Review compliance and approvals.	Ongoing compliance review and audit.	-	Implementation and adherence.	Compliance reviews, potential audits.
Food Safety Programs	Develop and implement accredited programs.	Update and validate programs as needed.	Update and validate programs as needed.	Review and update programs annually.	Revalidate and update programs.	Execution of validated food safety processes.	Compliance checks, third-party audits.
NATA Accreditation	Apply and obtain accreditation for lab testing.	Review and renew accreditation if needed.	Review and renew accreditation if needed.	Manage accreditation status.	Review and renew accreditation .	Execution of accredited testing methods.	Periodic audits and renewals.
Good Manufacturing Practices (GMP)	Implement GMP practices.	Review and ensure GMP practices.	Review and ensure GMP practices.	Maintain practices and conduct internal audits.	Complete external GMP audit.	Continuous adherence to GMP standards.	External GMP audits.
ISO Certification	Obtain relevant ISO certifications (e.g., ISO 22000).	Review and update ISO certifications .	Review and update ISO certifications .	Maintain and audit ISO standards.	Renew ISO certifications .	Adherence to ISO standards and implementation.	Periodic audits and renewals.
Local Council Regulations	Obtain necessary permits and approvals.	Review and update permits and approvals.	Review and update permits and approvals.	Maintain ongoing compliance.	Renewal of approvals/permits as required.	Compliance with local health and safety regulations.	Regular inspections by local authorities.
Environmental Health Standards	Ensure compliance with waste management standards.	Review and update compliance measures.	Review and update compliance measures.	Ongoing compliance review and audit.	Complete external environmental audit.	Implementation of waste management processes.	Environmental audits and compliance checks.
Food Safety Audits	Conduct initial food safety audit.	Conduct an audit prior to rollout.	Conduct an audit prior to rollout.	Conduct annual food safety audits.	-	Execution of food safety protocols.	Annual third-party audits.

Inbound Logistics and Supply

Material Sourcing and Supply

Bowen Food Futures Precinct offers several viable options for managing inbound logistics of key supplies and inputs required for the food processing plant, which includes not only the sourcing of fresh produce but also various packaging materials and other essential components. The primary focus will be on sourcing fresh produce locally. This will ensure a reliable supply of raw materials while supporting local agriculture and minimising transportation costs.

In terms of packaging, the processing plant will require a variety of solutions, including retail pouches, bulk packaging, and corrugated boxes. While efforts will be made to source these materials locally to support the regional economy and reduce lead times, it is anticipated that retail pouches might need to be sourced from overseas manufacturers due to specialised production requirements and cost considerations. Bulk packaging and corrugated boxes, however, have a higher likelihood of being sourced locally, balancing quality, lead time and cost-effectiveness.

Additionally, the plant will need to secure pallets for shipping the finished products. Partnering with major pallet rental companies such as Chep or Loscam is a feasible option to ensure a consistent supply of high-quality pallets. These companies offer efficient pooling systems that can help manage costs and simplify logistics.

Each supply-side component, from produce to packaging materials, will need to be meticulously sourced and costed. Inbound logistics will require strategic planning to ensure that all components are transported efficiently to the processing plant, minimising delays and maintaining the quality of inputs. Emphasising local sourcing wherever possible will not only support the regional economy but also align with sustainability goals by reducing the environmental impact associated with long-distance transportation.

The associated costs and time implications of either aspect will drive operating strategies in these areas. The Precinct's strategic approach to initially operating in smaller batch sizes to retain flexibility for contract production and the ability to scale up volumes over time whilst maintaining high-quality standards has shaped the inbound logistics and supplier considerations. **A comprehensive approach to risk and cost management, as well as local sourcing and availability, is critical for the success of inbound logistics.**

Figure 24: Major Supply Inputs

Input	Indicative Supplier	Supplier Locations
Water	Local grid	Local - Bowen
Electricity	Local grid	Local - Bowen
Key Agricultural Inputs	Local Growers	Regional – Bowen-Gumlu and Greater Whitsundays Region
Packaging Materials	Local Packaging Providers	Domestic and Imported
Co_2	Air Liquide	Regional - Townsville

Logistics and Distribution

The logistics and distribution strategy for the finished products of the food processing plant within the Bowen Food Futures Precinct will be pivotal to its overall success, especially given the anticipated scaling of operations over time. In the initial stages, when production volumes are relatively small, adopting a flexible logistics model will be crucial. This flexibility can be best achieved by outsourcing the logistics and distribution functions to a third-party logistics (3PL) or fourth-party logistics (4PL) provider. These providers offer scalability and expertise, allowing the processing plant to efficiently manage increasing volumes as the facility expands.

By leveraging the services of a 3PL or 4PL provider, the plant can access a range of benefits, including consolidated freight services. Consolidating freight enables the sharing of transportation resources with other businesses, which in turn helps to lower overall freight costs and improve delivery efficiency. This approach is particularly beneficial during the early stages when the shipment volumes are smaller, making it less economical to manage logistics in-house. The expertise of a seasoned logistics provider ensures that the plant can maintain optimal delivery performance without the burden of managing complex logistics operations internally.

As the plant expands and enters export markets, the role of a 3PL or 4PL provider becomes even more crucial. These providers can serve as freight forwarders and customs brokers, managing both Less than Container Load (LCL) and Full Container Load (FCL) shipments, facilitating cost-effective transport solutions regardless of shipment size. The provider's expertise in international logistics will be valuable in navigating customs regulations, managing paperwork, and ensuring timely delivery to global markets.

Proximity to major ports such as Townsville and Brisbane will streamline export processes, enhancing the facility's global reach. Outsourcing logistics to a capable provider will offer the flexibility needed to scale operations, allowing the plant to focus on core business activities while ensuring reliable and cost-efficient distribution channels.

Producer Willingness, Supplier Conditions and Offtake Agreements

Engaging Producers for Sustainable Supply

The success of the Bowen Food Futures Precinct hinges on strong partnerships with local producers. To ensure a stable and high-quality supply of feedstock, it is essential to secure producer willingness through transparent communication and mutual benefits. By establishing long-term supply agreements, the facility can offer producers financial stability and confidence. These agreements will help mitigate supply risks, support accurate production forecasting, and ensure an operational flow.

Bowen Food Futures Precinct's supply agreements with input suppliers should, at a minimum, contain the following terms:

- **Exclusivity**: Clarification on the exclusivity of the commercial relationship.
- **Product Specifications**: Detailed product specifications.
- **Pricing**: Price per unit, including calculation components and review mechanisms.
- **Pricing Review**: Annual review of prices based on the market conditions, current and immediately previous growing seasons and consumer demand.
- **Order Volume and Availability**: Volume of order and forecast availability.
- **Order and Delivery Process**: Specifications on location, date, and volume for delivery.
- **Certifications**: Product safety certifications, inspection requirements, sample requirements, and warranties/guarantees.
- **Traceability**: Batch/lot information for product traceability in case of a recall.
- **Defect Provisions**: Notification periods and refund criteria for defective products.
- **Goods Possession**: The point at which the product becomes the Precinct’s property and liability.

Price and supply variability will be managed through forward contracts and annual agreements with suppliers, ensuring volume and cost stability, especially for critical inputs.

Commercial Partnership and Offtake Agreement

Through off-take agreements, Bowen Food Futures Precinct can secure long-term buyers for its products, reducing the risk of surplus inventory and revenue loss. These agreements guarantee a consistent market for both the initial and expansion phases of the precinct, promoting financial stability and predictable cash flows. Furthermore, forming commercial partnerships can lead to collaborative marketing efforts, co-branded products, and shared market intelligence, which will enhance the precinct's competitive edge.

Forward Contracts Model for Key Inputs

Purchase volumes for critical ingredients such as tomatoes, capsicums and mangos, as well as other agricultural inputs, should be based on three-year agreements according to updated production estimates and yearly staged production objectives, with the price reviewed and reconfirmed annually based on any significant market changes.

Supplier Pre-qualification:

Robust approval process for suppliers before contracting to ensure compliance with relevant regulations and quality specifications. The following will be requested of a supplier in order to qualify them:

Figure 25: Supplier Pre-qualification Requirements

Requirement	Potential Documents/Action Points
Technical Data and Specification Suitability	Technical data sheets
	Product specifications
	Material safety data sheets (MSDS)
	Samples for preliminary quality testing
	Relevant ISO certifications (e.g., ISO 22000)

Requirement	Potential Documents/Action Points
	Food safety certifications (e.g., HACCP)
	Compliance certificates (if available)
Operational Integrity and Consistency	Overview of quality management processes
	Standard operating procedures
	Summary of past performance or track record
	Client references or testimonials
Delivery Capabilities	Basic logistics and delivery plans
	Overview of distribution networks
	Confirmation of delivery reliability and lead times

Material Qualification:

To uphold quality and safety standards, the following procedures will be implemented:

Certification documents will be required with each input delivery to verify quality and safety. Upon arrival, experienced staff will inspect the produce and sign off on shipment acceptance. The inspection will cover the following aspects:

- **Product Quality and Specifications**: Staff will check if the produce matches the specifications listed in the purchase order, such as size, colour, and ripeness.
- **Product Integrity**: Inspectors will look for any visible defects or damages, such as bruises, cuts, or signs of rot.
- **Product Safety**: The team will confirm with the supplier that the produce has been safely handled and stored, such as being kept at the correct temperatures prior to arrival.
- **Quantity and Volume**: Staff will measure and compare the delivered quantity/volume against the purchase order and check for any discrepancies or shortages in the shipment.
- **Delivery Schedule Adherence**: Inspectors will ensure the delivery is made within the agreed schedule and record any delays or early deliveries and their potential impact on operations.

Examples of Inspections:

- Visual inspections will be conducted to check for uniformity in size and colour, and to identify any signs of pests or disease.
- For perishable goods, temperature data loggers and communication with suppliers will be reviewed to ensure that the produce has been maintained within the required temperature range during transit.
- Random sampling might include testing for pesticide residues to ensure compliance with safety regulations.

Supplier Performance:

Suppliers who frequently deliver unsuitable produce or non-compliant shipments with respect to delivery schedules and volumes will be reconsidered for future purchase orders. Frequent non-compliance will lead to a review of the supplier's reliability and may result in the termination of the business relationship.

Quality Assurance at Goods Receipt:

Trained staff will conduct material qualification testing for incoming supplies, focusing on:

- Volume
- Specification adherence
- Damage/quality

Expected lead times for input supply deliveries will vary. However, given the short distance required and the relatively stable seasonality of the region, lead times are not expected to be an issue.

Stock and Inventory

Due to the seasonality of produce, the facility will counteract fluctuations by freezing harvested goods, ensuring a steady supply throughout the year. This strategy necessitates that produce stock may need to be stored in the facility's large-scale freezer containers for extended periods, potentially spanning weeks or months. This approach allows the produce to be preserved until freeze-drying capacity or bioactive compound extraction machinery throughput becomes available, ensuring continuous operations and maintaining product quality despite seasonal variations.

Figure 26: Estimated Inventory Holding Requirements

Stage	Produce (Fresh)	Estimated Inventory (kg)	Estimated Target Days Coverage
Pilot Stage	Tomato	2,000	30
	Capsicum	1,500	30
	Mango	1,000	30
Small Scale Commercial	Tomato	10,000	60
	Capsicum	8,000	60
	Mango	6,000	60
Large Scale Commercial	Tomato	50,000	90
	Capsicum	40,000	90
	Mango	30,000	90

Note: High-level estimates based on cool, freezer and ambient storage space, as well as seasonality and machine throughput.

Operating Schedule

Operating on a 5-day week with 8-hour shifts adheres to standard labour practices and aligns with both comparative freeze-drying facilities and regional processing plants more broadly. With 13 public holidays scheduled. The facility operates for 34 weeks annually, maintaining productivity with 238 available days after accounting for all planned downtimes.

The shift structure is divided into two halves, focusing on immediate and next-day batch preparations. Shifts are centred around the capacity of the freeze-drier, a key step for both freeze-drying pieces and powders as well as bioactive compounds, which takes on average between 18-22 hours per cycle, depending on the water content.

The operational framework of the processing facility, including operating schedule, planned downtime, total available time, and shift structure, includes:

Figure 27: Operating Schedule for the Precinct

Category	Details
Operating Days per Week	5
Shifts per Day	1
Hours per Day	8
Operating Hours per Day	8
Factory Closure per Year	0 days
Planned Maintenance	5 days
Preventive Maintenance (PM)	5 days
Rostered Days Off (RDOs)	0 days
Public Holidays	13 days
Total Planned Downtime	20 days/year
Total Available Weekdays	261 days
Total Available Days (after downtime)	238 days

Category	Details
Total Available Weeks in Year	48 weeks
First Half (4 Hours)	Preparing trays for immediate loading, unloading freeze-drying, ensuring quality
Second Half (4 Hours)	Preparing the batch for the next day (cutting, chopping, dicing)

Personnel

Bowen Food Futures Precinct will establish a flexible, lean, and purpose-fit team and organisational structure through their planned growth phases. Critical skills and functions will be established early to ensure a smooth transition through each growth phase. Bowen Food Futures Precinct will base its staffing and organisational structure on several key functions or activities. These functions can be blended into hybrid roles where appropriate skill sets are available or acquired. The personnel required per facility is as follows:

Figure 28: Personnel FTE and Cost breakdown

Role	Pilot Scale (FTE)	Pilot Scale Salary Costs ($)	Small Scale Commercial (FTE)	Small Scale Commercial Salary Costs ($)	Large Scale Commercial (FTE)	Large Scale Commercial Salary Costs ($)
OVERHEAD STAFF						
General Manager	1.0	175,000	1.0	175,000	1.0	175,000
Administrative Assistant	1.0	75,000	1.0	75,000	1.0	75,000
Director of Sales	-	-	1.0	150,000	1.0	150,000
Product Development Manager	-	-	-	-	1.0	122,000
MANUFACTURING STAFF						
Supervisor/Health & Safety/QA Manager	1.0	117,000	1.0	117,000	1.0	117,000
Senior Process Technician	1.0	110,000	2.0	220,000	3.0	330,000
Trainee Process Technician	-	-	1.0	60,000	2.0	120,000
Quality Control/Assurance Technician	-	-	-	-	1.0	75,000
TOTAL FTE	4.0		7.0		11.0	
TOTAL SALARY COSTS ($)		477,000		797,000		1,164,000

Note: The Manufacturing Supervisor will also take on the responsibilities of Health & Safety and QA Manager (prior to the hiring of the Quality Controller).

Note: The Administrative Assistant will assist with sales processing, office administration, inventory, planning and maintenance planning.

Note: Where achievable, due to the difficulty and cost in obtaining certain specialisations, positions will be outsourced. This includes sales and administrative assistant roles whenever feasible.

Employment Obligations and Legislation

Bowen Food Futures Precinct will adhere to numerous employment obligations mandated by Queensland state and federal regulations. These obligations are listed below with resources and recommended actions to ensure compliance:

Figure 29: Employment Obligations and Legislation

Item	Action
Workers' Compensation	As an employer, Bowen Food Futures Precinct must ensure its workers are protected against work-related incidents. *Visit the Queensland Government website for more information*.
Tax (PAYG and Payroll) and Superannuation	Report employee earnings to the Australian Taxation Office (ATO), collect PAYG withholding, report FBT, and contribute to employee superannuation funds. *Learn more at the ATO website*.
Termination of Employment	Adhere to rules about final notice and final pay, including rights and obligations related to redundancy and bankruptcy. *Details are available on the Federal Government's website*.
Industrial Relations/Disputes	Manage work-related obligations and entitlements between employers and employees under the Fair Work Act 2009. Understand these requirements, including minimum wages, awards, agreements, industrial actions, and dispute resolution on the *Fair Work Commission website*.
Human Rights and Equal Opportunity	Comply with the Equal Opportunity Act 2010 and federal anti-discrimination laws. Employers are legally responsible for workplace discrimination, bullying, sexual harassment, and victimisation incidents.
Workplace Health and Safety	Meet various Workplace Health and Safety requirements specific to Queensland. *Find a list of these requirements here*.
Parental Leave	Eligible working parents receive 18 weeks of parental leave pay at the national minimum wage, funded by the Australian Government and processed by employers. *Learn the requirements here*.
Negligence	Bowen Food Futures Precinct has a duty of care to its workers. For a common law claim against the precinct, an injured worker must demonstrate a breach of duty of care. *More information on common law and liability can be found here*.
Holiday and Long Service Leave	Entitlement to long service leave is based on 10 years of continuous service, providing 8.6667 weeks of paid leave. *Details are available here*.
Employment Contracts	All employees will have contracts outlining terms and conditions, ensuring compliance with the National Employment Standards (NES). *Further Information here*.
Industry Awards	Employees are entitled to minimum wages and conditions set out in industry awards unless covered by an enterprise agreement. *More details are available on the Fair Work Ombudsman website.*

Supporting Technology

Bowen Food Futures Precinct will deploy technology solutions to support Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), and Warehouse Management (WMS). These systems will not be implemented until at least the small-scale commercial stage of the Bowen Food Futures Precinct.

An ERP will be essential for managing finance, inventory, scheduling, and customer orders. Solutions will be selected based on the projected needs over 3-5 years of operation. The majority of machinery requiring technical expertise should be provided by the machinery manufacturer or provider in question. Technicians should be dispatched to the facility to upskill employees in the relevant areas.

PRECINCT MASTER PLANNING

Strategic Vision for Sustainable Growth and Innovation

The Precinct Master Planning study tests potential spatial solutions and pathways for both the initial pilot facility and future growth.

This section is broken into the key aspects of the Precinct Master Planning study, including:

- **Spatial Requirement Testing** involving high-level spatial testing of three different scales of operations (including pilot, small and large) to demonstrate the spatial requirements for each phase and assist in understanding the needs represented by throughput growth.
- **Sites of Interest Identification:** identifying multiple potential siting opportunities in Bowen, to provide flexibility for procurement and potential partnership considerations.
- **Planning Considerations:** study of potential town planning approval pathways, testing feasibility/considerations for delivery of facilities at the potential sites of interest.
- **Development Scenario Option Mapping**: to demonstrate potential options for growth to assist investment/business plan decision planning.
- **Site Test Fit**: explores the potential to locate the facility in an existing building, as an example development scenario, to minimise initial investment required. Bowen TAFE Block E was selected as initial test fit study as it is understood to be currently underutilised and presents a potential education training opportunity for the TAFE, which could support cross-subsidised investment.
- **New Build Development Scenario:** The baseline development scenario would involve building a new production facility, from the 'ground up', on an underutilised/vacant site.

Spatial Requirement Testing

The spatial requirement testing is conducted to validate assumptions from the production/manufacturing processes for three potential scales of facility and ensure that the facility's layout can accommodate the necessary equipment and processes and aid the positioning of the business case to target scales of output. Please note that:

- The purpose of this study is to support the high-level site test fit analysis and assist further technical and costing investigations
- High-level assumptions are shown in relation to circulation space and clearance between equipment/uses, with further external space for storage and handling likely required, potentially externally
- Freeze, cool and ambient container storage units are shown outside of the main facility areas (shown in grey)
- Vehicle loading and handling space has not been quantified and would be additional to the below internal spatial analysis

Pilot Scale

Figure 30: Pilot Scale Spatial Equipment Requirements

CODE	ITEM	SIZE (M) (LxWxH)	COMMENT/ASSUMPTIONS
FR	Freezer	2.99 x 2.44 x 2.59	10' container
COOL	Cool Room	2.99 x 2.44 x 2.59	10' container
AMBI	Ambient Store	2.99 x 2.44 x 2.59	10' container
IQF	IQF Blast Freeze	3 x 3 x 2.6	
FD	Freeze Dryer	4 x 5 x 2.96	Plus 0.7m in front of the door.
PACK	Packaging area	3 x 3 x 2.6	
B	Stainless bench	1.2 x 0.6 x 0.9	
WET	Wet processing area	3 x 4 x 2.6	
IT	Immersion COP Tank	1.22 x 0.61 x 0.53	
B	Stainless bench	1.2 x 0.6 x 0.9	For fruit and veg prep machines.

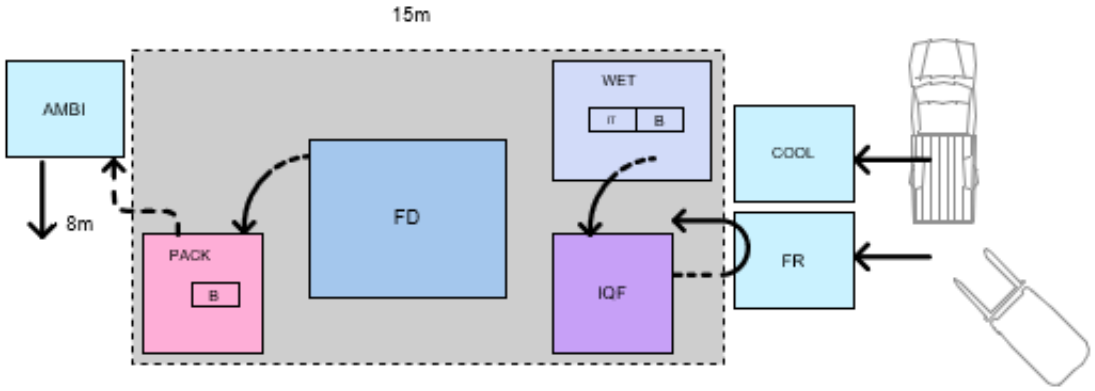


Figure 31: Pilot Scale Commercial high-level spatial analysis

Small Scale Commercial

Figure 32: Small Scale Spatial Equipment Requirements

CODE	ITEM	SIZE (M) (LxWxH)	COMMENT/ASSUMPTIONS
FR	Freezer	12.12 x 2.44 x 2.60	Shown as 2 x 20' containers.
COOL	Cool Room	6.06 x 2.44 x 2.60	20' container
AMBI	Ambient Store	6.06 x 2.44 x 2.60	20' container
PROC	Processing Room	4 x 3 x 2.6	Includes thawing area
IQF	IQF	4 x 3 x 2.6	
FD1	Freeze Dryer	4 x 5 x 2.96	Plus 0.7m in front of the door.
FD2	Freeze Dryer	7.7 x 2.63 x 2.96	Plus 3 x 3m in front of chamber (location of clear area TBC)
PACK	Packaging area	8 x 3 x 2.6	
HP	Hopper Packing Machine	2.85 x 1.03 x 2.73	
B	Stainless bench	1.5 x 0.6 x 0.9	
WET	Wet processing area	8 x 4 x 2.6	
IT1	Immersion COP Tank	1.22 x 0.61 x 0.53	
IT2	Immersion COP Tank	1.83 x 0.61 x 0.53	
B	Stainless bench	1.2 x 0.6 x 0.9	For fruit and veg prep machines.

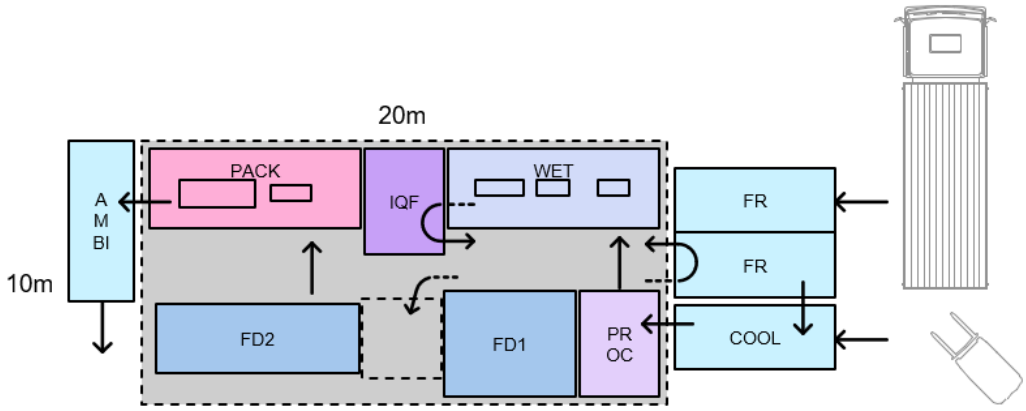


Figure 33: Small commercial high-level spatial analysis

Large Scale Commercial

Figure 34: Large Scale Commercial Spatial Equipment Requirements

CODE	ITEM	SIZE (M) (LxWxH)	COMMENT/ASSUMPTIONS
FR	Freezer	12.12 x 2.44 x 2.60	
COOL	Cool Room	12.12 x 2.44 x 2.60	
AMBI	Ambient Store	12.12 x 2.44 x 2.60	
PROC	Processing Room	3 x 4 x 2.6	Includes thawing area
IQF	IQF	4 x 3 x 2.6	
FD1	Freeze Dryer	4 x 5 x 2.96	Plus 0.7m in front of the door.
FD2	Freeze Dryer	7.7 x 2.63 x 2.96	Plus 3 x 3m in front of chamber (location of clear area TBC)
FD3	Freeze Dryer	7.2 x 2.80 x 2.58	Plus 1m each side of the machine. Plant skid footprint: 5.8 x 2 x 2.35 m (LxWxH), assumed to be overlapping the machine footprint.
BCEA	Bioactive Compound Extraction Area	4.5 x 3 x 2.6	
PACK	Packaging area	8 x 3 x 2.6	
HP	Hopper Packing Machine	2.85 x 1.03 x 2.73	
B	Stainless bench	1.5 x 0.6 x 0.9	
WET	Wet processing area	8 x 4 x 2.6	
IT	Immersion COP Tank	1.83 x 0.61 x 0.53	
B	Stainless bench	1.2 x 0.6 x 0.9	For fruit and veg prep machines

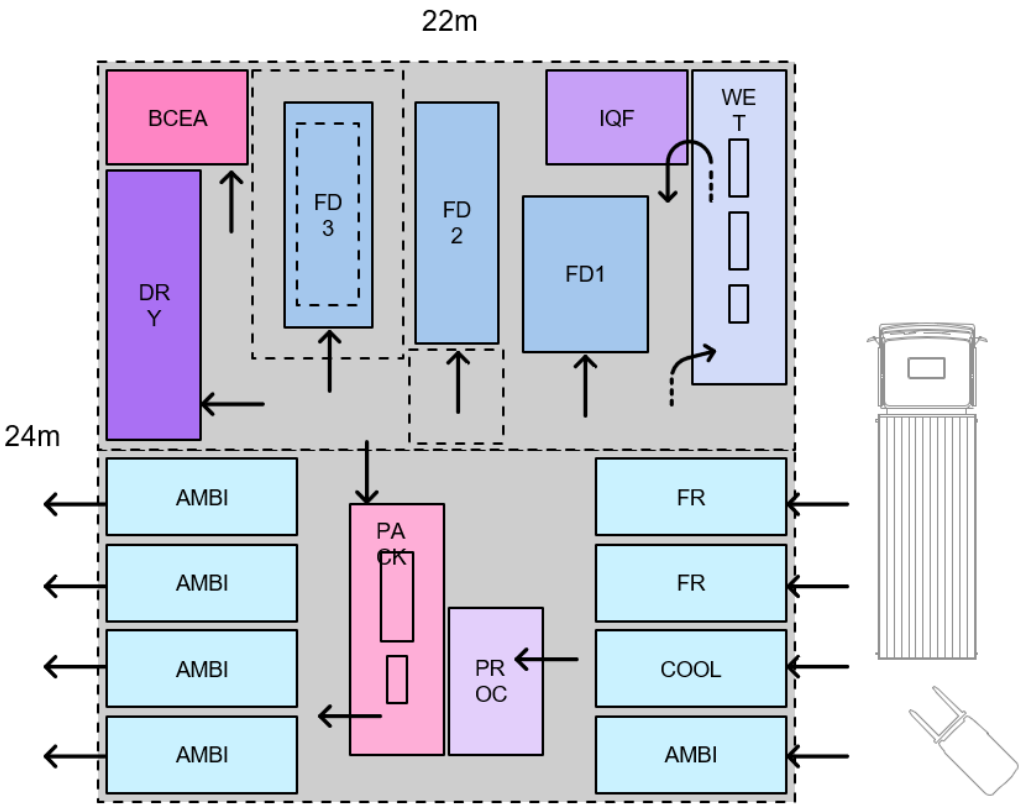


Figure 35: Large commercial high-level spatial analysis

Sites of Interest Identification

The selection of sites for the Bowen Food Futures Precinct was strategically informed by functionality and accessibility. The chosen sites include the Growers Association on Warwick Road, Bowen TAFE on Queens Road, Bowen Airport on Bruce Highway, and Nutrano on Bootooloo Road. These locations were selected for their proximity to key infrastructure and existing agricultural facilities, essential for efficient logistics and operations. Additionally, the sites offer opportunities for industry collaboration with education and training via Bowen TAFE and the re-use of existing buildings to minimise initial capital investment during the pilot phase.

Figure 36: Sites of Interest

Site	Location	Comments
1	**Growers Association** *Warwick Road Bowen QLD*	This site is strategically chosen for its proximity to key agricultural stakeholders, facilitating collaboration and resource sharing.
2	**Bowen TAFE** *98-158 Queens Road Bowen QLD*	This location offers valuable opportunities for industry collaboration experience for an educational training institution, as well as potential to re-use underutilised building assets to minimise initial cost.
3	**Bowen Airport** *18793 Bruce Highway Bowen QLD*	The airport's location is ideal for efficient logistics and transportation, with potential for optimised logistics layout and connections.
4	**Nutrano** *337 Bootooloo Road Bowen QLD*	This site is selected for its existing agricultural facilities, as well as its potential to re-use underutilised building assets to minimise initial cost.

Figure 37: Map of locations of sites of interest.

Planning Considerations

Planning Framework

Strategic Framework

Queensland State Planning Policy

Queensland's State Planning Policy covers five main topics. These include:

- Planning for liveable communities and housing
- Planning for economic growth
- Planning for the environment and heritage
- Planning for safety and resilience to hazards
- Planning for infrastructure

For this report, and the development of a Bowen Food Futures Precinct - Planning for economic growth recognises that Queensland possesses valuable natural assets, resources, tourism attractions, and proximity to markets.

Building upon the Queensland State Planning Policy, the development of this project will focus on effective and responsive planning to provide the right conditions for growth across all parts of the economy. Planning is essential for enhancing the links between productive areas and industries, workforces, supply chains, and consumers. It will facilitate the availability of well-located and serviced land for business and industry with access to suitable infrastructure networks.

In line with the principles of local planning outlined by the Queensland Government, the project will improve opportunities for increased agricultural investment, production, and diversification. This includes enabling value-adding activities such as on-farm processing, farm gate sales, and agricultural tourism to occur in appropriate locations, thereby providing support for agricultural industries. Specific State Planning Policies in relation to agriculture of note, specific to this proposal include:

- Considering the provision of infrastructure and services necessary to support a strong agriculture industry and associated agricultural supply chains.

Mackay, Isaac, and Whitsunday Regional Plan

The Mackay, Isaac and Whitsunday Regional Plan's vision is to be a vibrant, progressive region where the values of the community and industry are respected and in balance with the natural environment.

Further, the regional plan identifies that the region's natural assets and abundant resources will be responsibly managed for the benefit of residents, visitors, and future generations. The regional plan also acknowledges that the region can achieve its potential with a range of industries, employment and learning opportunities for everyone. The regional plan states that the region has a resilient and inclusive community that respects and offers diversity and choice, and where residents and visitors enjoy a healthy, active, and safe lifestyle.

As identified in the regional plan, a significant challenge for the region is to develop greater industry diversification to create resilient communities, and to strengthen the economy through diversification and long-term planning, to enable a a more robust economic base to be development and for a wider range of employment and economic opportunities to be achieved. This approach will assist in improving the long-term economic sustainability of the region.

Regarding Bowen, as set out in the regional plan, the local economy is based on a nationally significant horticulture industry, commercial fishing, aquaculture, and a major salt processing facility. Horticultural activity in the Bowen area attracts transient workers, including a considerable proportion of backpackers, further diversifying the needs of the community. The regional plans set out that the impacts of flooding and storm tide inundation, as well as the projected effects of climate change, need to be considered through planning for both in the existing developed areas, and areas subject to further investigations. Water supply and sewerage facilities are also development constraints for the town. In addition, the regional plan states that there is a need for protection of superior quality agricultural land limits potential urban expansion.

The following policies and programs within the Regional Plan are relevant to the consideration of the development of the Bowen Food Futures Precinct.

- Further develop and diversify existing and potential primary production and rural industries to enhance the contribution to the regional economy and regional landscape.

- Support the development of agritourism to diversify and build resilience in both industries.

Identify and support value-added food processing and manufacturing opportunities, while encouraging the expansion of production and processing of agricultural products within the region.

Whitsunday Regional Economic Development Strategy

The Whitsunday Regional Economic Development Strategy is a short statement of expression of intent by the Whitsunday Regional Council about how it is to go about creating more economic opportunities within the Whitsunday Region.

Supported by consultations with high-ranking Whitsunday Regional Council officials, it is evident council seeks to: promote and market the region for investment, facilitate investment into the region, promote and market the region for tourism, support local business networks, engage with key industries and businesses to develop supply chains and value adding opportunities, and support and encourage development and redevelopment opportunities.

The development of larger projects sees the Council's role as lobbying through collaboration with regional partners. Promotion of these opportunities can take place in several ways. These include: the preparation of business case materials (to support lobbying efforts for catalytic projects), creation of marketing materials (both digital and downloadable PDFs), conducting awareness raising activities, as well as working with regional partnerships to build support to further promote projects.

A planning environment which encourages investment and jobs will be central to the Council's ability to support outcomes in relation to this. Activities including conducting pre-lodgement meetings, engaging proactively with proponents and using various incentives for some projects will all leverage the planning and regulatory role that the Council plays.

Bowen Masterplan 2021

The Bowen Masterplan 2021 outlines a comprehensive strategy to enhance liveability, health, wellbeing, town beautification, and create conditions for small business success in Bowen. The primary projects listed in the masterplan are:

- Tourism and Liveability
- Beautiful Bowen Project
- Façade Improvement Policy
- Bowen Green Core
- Flagstaff Hill Multi-purpose Facility
- Mullers Lagoon Park Masterplan
- Cycle Route Enhancements
- Interpretive Historical Signage
- Bowen Boardwalk and Hiking Track
- Greening and Growing Bowen.

The **Bowen Masterplan 2021** outlines several initiatives to support agriculture and innovation in the region, including:

- **Agricultural Support**: The plan emphasizes the importance of the horticulture industry, commercial fishing, aquaculture, and a major salt processing facility in Bowen. It aims to further develop and diversify existing and potential primary production and rural industries to enhance their contribution to the regional economy and landscape.
- **Innovation and Collaboration**: The Bowen Food Futures Precinct is a significant part of the masterplan. It aims to foster collaboration among agricultural producers, bio-manufacturers, and value-adding businesses to drive innovation and sustainability within the Bowen-Gumlu region. The Precinct will focus on developing production and processing facilities near abundant feedstocks, enhancing new market opportunities, improving production efficiencies, and supporting eco-friendly processes such as biofuel production and waste product utilization.
- **Infrastructure and Feasibility**: The masterplan includes detailed planning processes for setting up pilot facilities, conducting feasibility studies, and initiating detailed design and procurement stages. This structured approach ensures that foundational activities are completed and ready for the detailed work in subsequent stages.
- **Economic and Environmental Sustainability**: The plan highlights the need for long-term planning to build a more robust economic base, provide a wider range of employment and economic opportunities, and improve the long-term economic sustainability of the region. It also addresses the impacts of flooding, storm tide inundation, and climate change, emphasizing the need for responsible management of natural assets and resources.

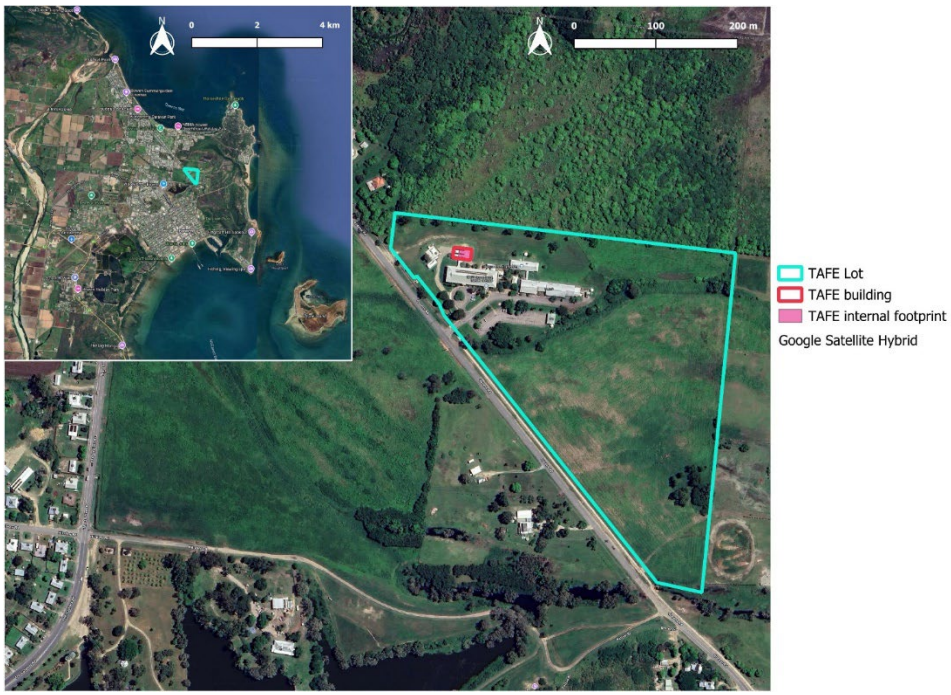
These initiatives collectively aim to strengthen the agricultural sector and promote innovation, ensuring a sustainable and resilient future for the Bowen-Gumlu region.

Planning Considerations – Site Options

The following tables outline the planning considerations for the Site Options. Detailed Planning reviews are attached in Appendix 1

TAFE Bowen Campus – 98-158 Queens Road, Bowen

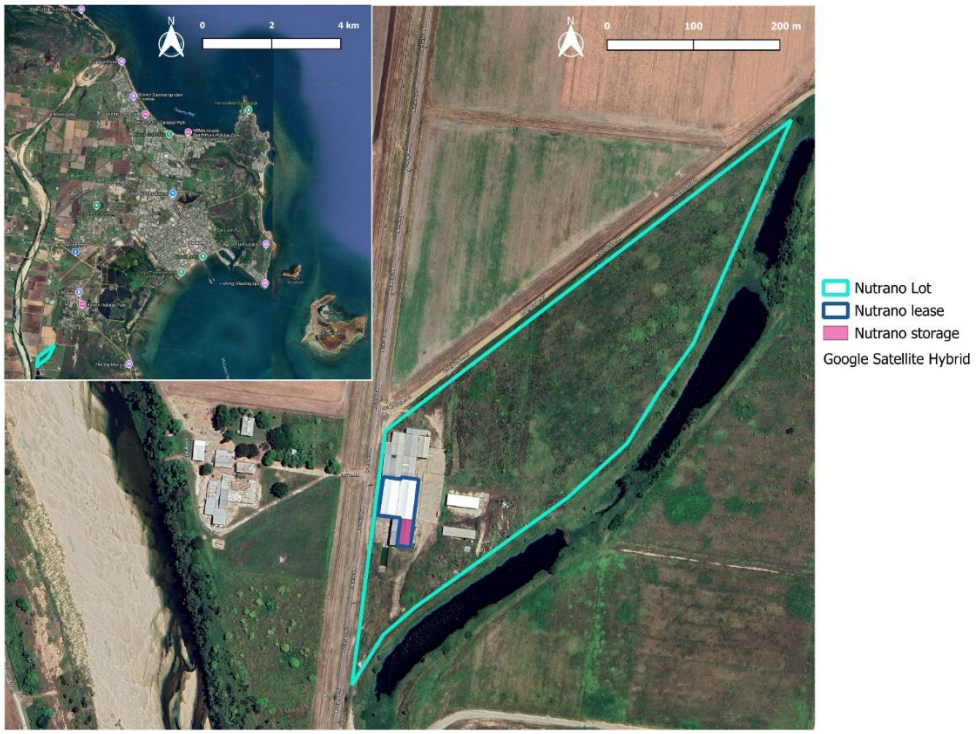
Figure 38: TAFE Bowen Campus Site Overview

Address:	TAFE Bowen Campus – 98-158 Queens Road, Bowen 
Legal Description:	38CP858278
Council:	Whitsunday Regional Council
Site Area:	Site estimate: 106,004m^2 Subject building estimate: 294m^2 Internal building footprint estimate: 204m^2
Current Land Use:	The site is currently used as the Bowen TAFE Site.
Topography & Regularity:	The site appears relatively flat with buildings and access built on an elevated levee.
Services:	It is unknown what services are currently available to the Site. Overhead powerlines are evident from KPMG Desktop Analysis from Queens Road.
Environmental context:	KPMG Desktop Analysis – refer to Property Report in Appendix 1. • Site contains Medium and Low Risk Acid Sulphate Soils • The southeastern part of the Site, adjacent to Queens Road, contains a Bushfire Potential Impact Buffer. • Significant parts of the SE of the Site are affected by a permanent inundation area in relation to coastal erosion. • The site is affected by inundation due to storm tide. A wave run-up area affects northern parts of the Site. • MSES Regulated Vegetation Category B, and intersecting a watercourse affects the Site.

	• Site is located within a Flood Hazard Area.
Current improvements:	Educational facility – Bowen TAFE, including all relevant buildings.
Other notable features:	It is located a short distance from Bowen Town Centre (Approx 2.2km).
Relevant Planning Instrument	Whitsunday Planning Scheme 2017
Zoning	Communities Facilities Zone
Planning Pathway	Assessable development subject to an impact assessment.

Nutrano Site, 337 Bootooloo Road, Bowen

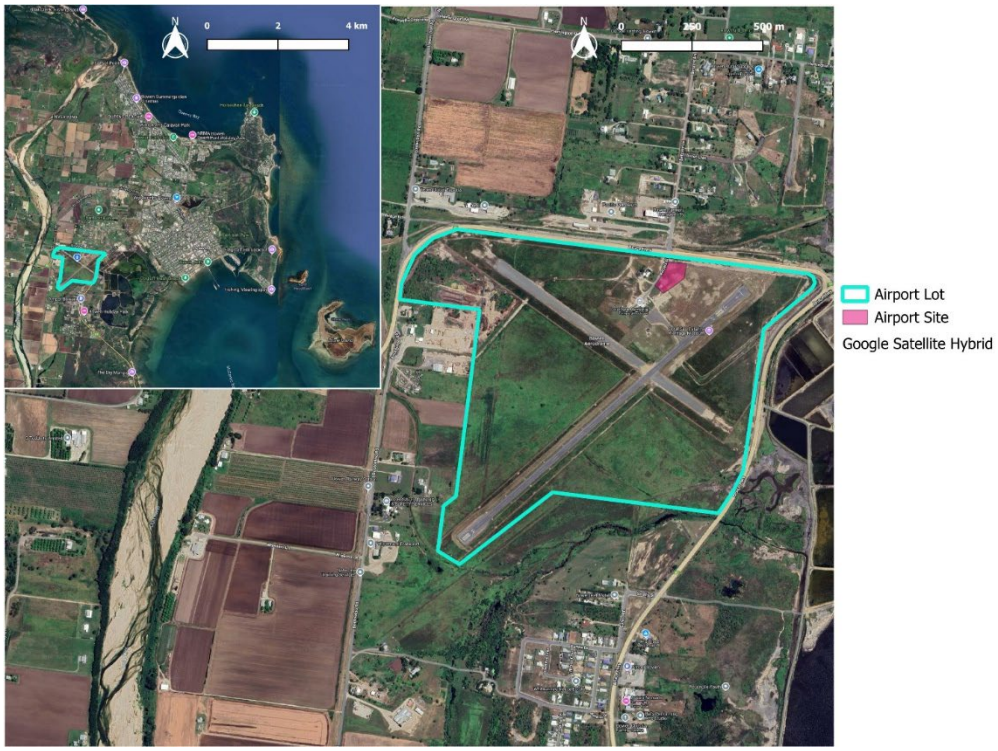
Figure 39: Nutrano Site Overview

Address:	Nutrano Site, 337 Bootooloo Road, Bowen 
Legal Description	55SP230505
Council:	Whitsunday Regional Council
Site Area:	Site estimate: 94,830 m^2 Nutrano lease area estimate: 2,395m^2 Nutrano storage area estimate: 494 m^2
Current Land Use:	The site is currently used as the Nutrano lease and storage area Site.
Topography & Regularity:	The site appears flat from the KPMG Desktop analysis.
Services:	It is unknown specifically what services to the Site are already in place and available. Overhead powerlines are evident from the KPMG Desktop analysis from Bootooloo Road.

Environmental context:	KPMG Desktop Analysis – refer to Property Report in Appendix 1. • Site contains Land above 5m AHD and below 20m AHD, Sulphate Soils • Site is within a locally important agricultural area. • Existing Railway Buffer Categories 0,1,2,3, & 4 • A Major electricity buffer runs along Bootooloo Road. • Eastern boundary of site affected by MSES Regulated Vegetation Category R, • Site is located within a Flood Hazard Area. • Easement runs along eastern boundary of Site
Current improvements:	Storage facility in a rural zoned area. Current rural-based buildings.
Other notable features:	The Site Is located adjacent to a railway line. Don River is located within 300m to the west.
Relevant Planning Instrument	Whitsunday Planning Scheme 2017
Zoning	Rural Zone
Planning Pathway	Assessable development subject to an impact assessment.

Bowen Aerodrome, Bruce Highway, Bowen

Figure 40: Bowen Aerodrome Site Overview

Address:	Bowen Aerodrome, Bruce Highway, Bowen 
Legal Description	237SP218205
Council:	Whitsunday Regional Council
Site Area:	KPMG Site estimate: 1,024000 m^2

	Developable Area estimate: 7,023m^2
Current Land Use:	The site is currently used as the Bowen Aerodrome.
Topography & Regularity:	The site appears relatively flat from the KPMG Desktop analysis.
Services:	It is unknown what services to the Site are already in place and available. Overhead powerlines are evident from KPMG Desktop analysis crossing the Bruce Highway.
Environmental context:	KPMG Desktop Analysis – refer to Property Report in Appendix 1. • Site contains both Low Risk and Land above 5m AHD and below 20m AHD Sulphate Soils. Developable area is low risk. • The site is surrounded by a locally important agricultural area, but Aerodrome is excluded from that area. • Site is located within a coastal management district – erosion-prone area. • Site is located within a Flood Hazard Area. • Site is partly affected by MSES-Regulated Vegetation (Category R) - intersecting a watercourse (Stream Order: 1). Developable area not affected. • Site is located within the existing Railway Buffer and Road Noise Corridor • The site is affected by the water treatment facility buffer. Developable area is not affected.
Current improvements:	The site is currently used as the Bowen Aerodrome. The Proposed Developable area is currently vacant land. There is an existing building (previously used as a skydiving office) which, on initial analysis, wouldn't be suitable for use within this development.
Other notable features:	Located adjacent to the Bruce Highway.
Relevant Planning Instrument	Whitsunday Planning Scheme 2017
Zoning	**Community facilities zone**
Planning Pathway	Assessable development subject to an impact assessment.

DPI Site, Chandlers Road, Bowen

Figure 41: DPI Site Overview

Address:	DPI Site, Chandlers Road, Bowen

	
Legal Description	1RP715403
Council:	Whitsunday Regional Council
Site Area:	Site estimate: 90,300m^2 DPI Site Developable Area estimate: 5,516m^2
Current Land Use:	The site is currently used as the DPI Site.
Topography & Regularity:	The site appears flat from the KPMG Desktop analysis, and the developable area is located on an elevated platform approximately 1m above the surrounding lands.
Services:	It is unknown what essential services to the Site are already in place and available. Overhead powerlines are evident from the KPMG Desktop analysis along Chandler's Road.
Environmental context:	KPMG Desktop Analysis – refer to Property Report in Appendix 1. • Site contains Land above 5m AHD and below 20m AHD, Sulphate Soils • Site is within a locally important agricultural area. • Existing Railway Buffer Categories 0,1,2,3, & 4 • Site is located within a Flood Hazard Area.
Current improvements:	The site is used for horticultural purposes by the Department for Primary Industry (DPI) The developable area currently contains a shed and some trees.
Other notable features:	Located in close proximity to a railway line.
Relevant Planning Instrument	Whitsunday Planning Scheme 2017
Zoning	**Rural zone**
Planning Pathway	Assessable development subject to an impact assessment.

Development Scenario Options Mapping

The development scenarios for the Precinct Master Plan include three high-level options, each offering flexibility to move between scenarios as the project evolves.

Option 1 – Offsite Pilot/New Build Commercial – involves starting with an offsite pilot at a pre-established processing facility and then transitioning to a new build commercial facility as the project grows. This allows for initial testing and refinement of processes before committing to a larger investment.

Option 2 – Lease Existing Space and Commercial – focuses on leasing existing space for the pilot phase and then expanding into a commercial facility. This option provides a cost-effective way to start operations quickly while evaluating the feasibility of a larger-scale development.

Option 3 – New Build Pilot and Commercial – entails building both the pilot and commercial facilities from the ground up, ensuring that the infrastructure is tailored to the project's specific needs from the outset. This approach offers the most control over the development process and allows for seamless scaling as the project progresses.

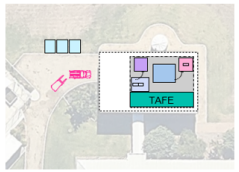
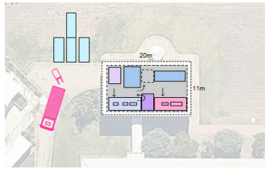
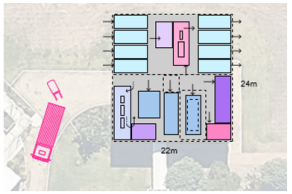
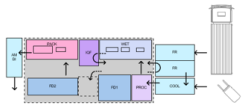
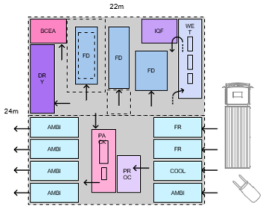
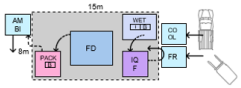
	Pilot Scale / 100 kg p/day	Small Scale / 700 kg p/day	Large Scale / 2500 kg p/day
Option 2 – Lease Existing Space and Commercial: focuses on leasing existing space for the pilot phase and then expanding into a commercial facility. For demonstration purposes Bowen TAFE Block E test fit shown. Nb.: storage containers shown separately as additional sqm areas.		 Likely requires expansion of shed to full under roof area with expansion internal area by approx. 50 sqm	 Likely requires expansion of full building by approx. 250sqm to meet ~550sqm.
Option 1 – Offsite Pilot/New Build Commercial: involves starting with an offsite pilot and then transitioning to a new build commercial facility as the project grows. Nb.: storage containers shown separately as additional sqm areas.	Upgrade underutilised existing local shed, for instance Bowen TAFE Block E, with ~120sqm usable food grade area.	 Purpose built commercial facility, of approx. 200 sqm plus areas for container storage, loading and handling.	
Option 3 – New Build Pilot and Commercial: entails building both the pilot and commercial facilities from the ground up, ensuring that the infrastructure is tailored to the project's specific needs from the outset. Nb.: storage containers shown separately as additional sqm areas.	 Purpose built commercial facility, of approx. 120 sqm, plus areas for container storage, loading and handling.	Skip the interim step and move straight to full scale production.	Purpose built commercial facility, of approx. 550 sqm plus areas for container storage, loading and handling.

Figure 42: Development Scenario Options Mapping

Site Test Fit: Bowen TAFE – Block E

Bowen TAFE Block E was selected as the initial test fit site because it presents a potential kick-start opportunity to initiate the project with minimal capital investment (compared to a new build), a pre-built facility, access to amenities, and a convenient position within Bowen. Additionally, the initial pilot phase could allow the TAFE to continue using a portion of the building for storage and handling. As the facility's needs grow, the internal area could be expanded to utilise the entire existing roof area. It is also noted that there is potential for an alternative loading route if the existing route capacity is reached as the facility throughput expands. This setup not only supports the project's operational needs but also offers an excellent opportunity for industry experience, such as forklift training for TAFE students.

Note: for the purpose of this study, it is assumed that freeze, cool, and ambient storage containers will be located adjacent to the facility.

Existing Building

The existing building on the TAFE site, an underutilised existing local shed, is around 154 sqm internally, with a relatively flat roof that extends towards the vehicle path to provide a car-vehicle port, of approximately 286 sqm. The existing building services and the condition of the internal space require further assessment and are likely to require upgrading.

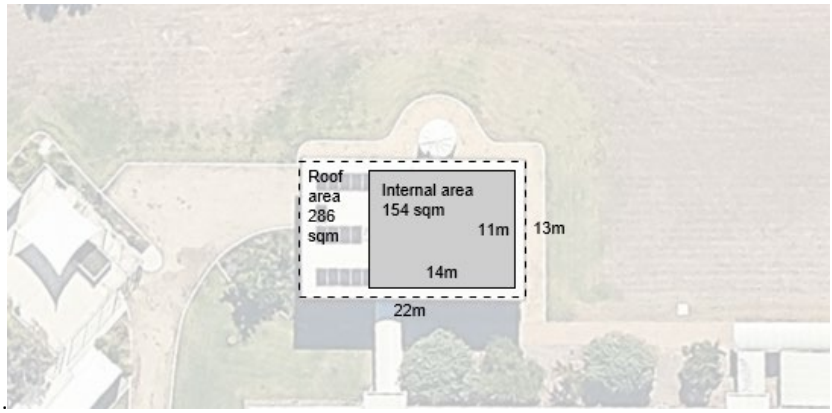


Figure 43: Analysis of Bowen TAFE Block E existing building size

Pilot Scale: 100 kg p/day

The pilot facility will involve upgrading the existing local shed (see Appendix 1 for details), such as Bowen TAFE Block E, to create a usable food-grade area of approximately 120 square meters. During this phase, the TAFE could retain the use of around 30 square meters of the internal area (green).

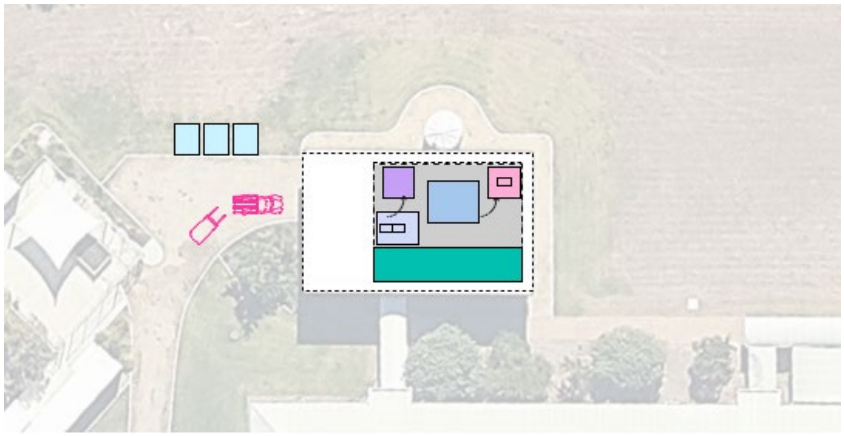


Figure 44: Pilot Scale test fits in Bowen TAFE Block E

Small Scale Commercial: 700 kg p/day

The small-scale facility reusing Block E will likely require expanding the existing shed to utilise the full under-roof area, increasing the internal space by approximately 50 square meters.

Figure 45: Small-scale Commercial test fit in Bowen TAFE Block E

Large Scale Commercial: 2.5 tonne p/day

The large-scale facility reusing Block E will likely require expanding the full building by approximately 250 square meters to meet a total of around 550 square meters.

Figure 46: Large-scale Commercial test fit in Bowen TAFE Block E

New Build scenarios

Introduction

The baseline development scenario involves building a new production facility, from the 'ground up', on an underutilised/vacant site. There are several advantages and potential benefits to this approach, however, it would require a larger initial capital cost than a retrofit scenario. One of the key benefits of the new build approach is the flexibility in site selection and layout. By choosing a vacant site, the project can optimise the location for accessibility, logistics, and future expansion. This could lead to improved long-term operational efficiency and reduced transportation costs. Building a new facility also invites holistic consideration of modern technologies and sustainable practices, such as renewable energy sources and advanced waste management systems, which can enhance the facility's environmental credentials and reduce long-term operational costs, whilst also requiring initial investment consideration.

Furthermore, a precinct-scale development of approximately 900sqm could integrate innovation and bioenergy facilities to enhance sustainability and economic growth. This development would foster collaboration between agricultural producers, bio-manufacturing, and value-adding businesses, promoting environmental sustainability and creating new industry and skilled job opportunities.

Note: Refer to the spatial requirement study for spatial function assumptions

Pilot Scale: 100 kg p/day

A new build pilot facility would require around 120 square meters of internal production space, with additional freeze, cool and ambient storage containers, loading and handling space.

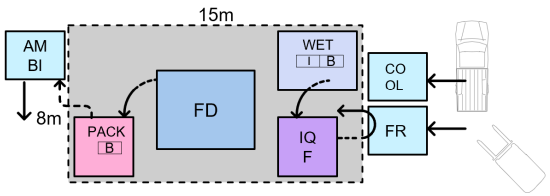


Figure 47: Pilot Scale new build

Small Scale Commercial: 700 kg p/day

A new build pilot facility would require at least 200 square meters of internal production space, with additional freeze, cool and ambient storage containers, loading and handling space.

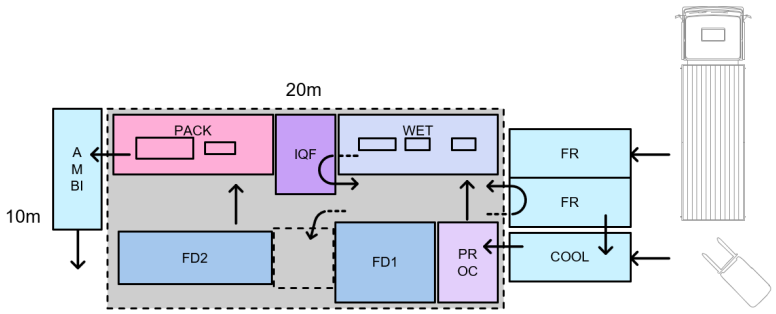


Figure 48: Small Scale Commercial new build

Large Scale Commercial: 2.5 tonne p/day

A new build pilot facility would require at least 550 square meters of internal production space, with additional loading and handling space.

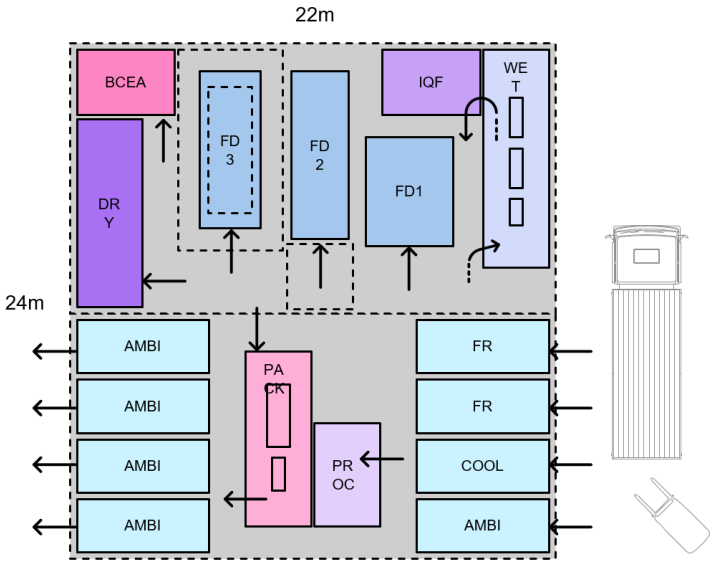


Figure 49: Large-scale Commercial new build

Precinct Scale Commercial: 2.5 tonne p/day with innovation hub

A new build pilot facility would require at least 900 square meters of internal production space, with additional loading and handling space.

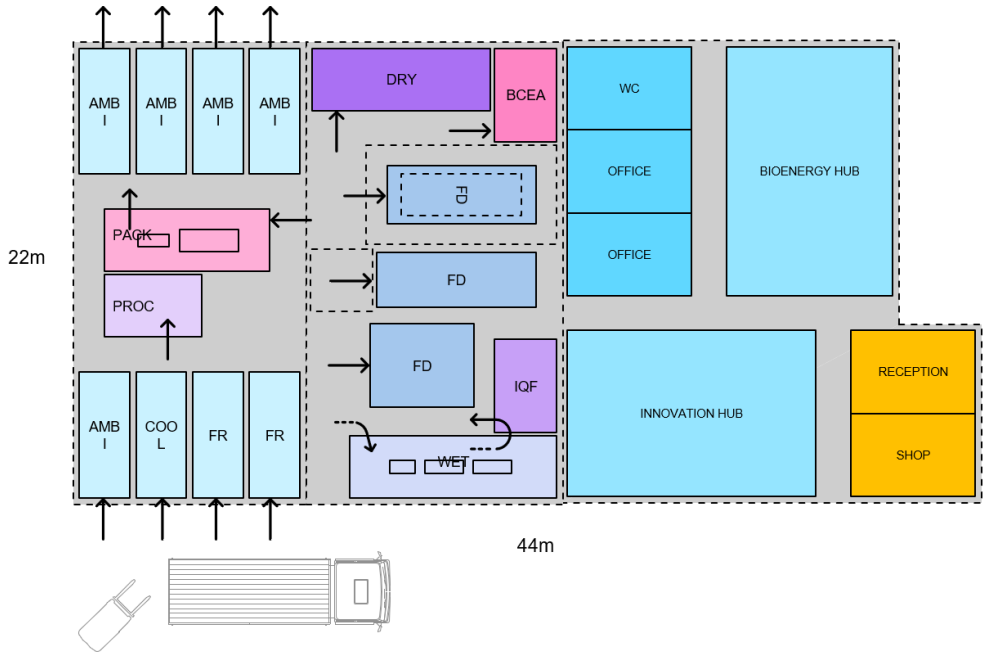


Figure 50: Precinct-scale Commercial new build

New Build scenarios test fitting.

Given the size and scale of the available sites, the new build scenarios can be accommodated within any of the available site options. The TAFE site has been tested for retrofit only and not for a new build. The other three identified sites do not restrict the capability to develop either a staged or full-scale commercial facility, as described below:

- **Nutrano**: There is sufficient space within the available space within the facility, including potentially within the undercroft of the loading area adjacent to the existing cool rooms.
- **Bowen Aerodrome**: Ample area to facilitate a new build. The existing skydiving building has not been identified as suitable in scale or construction.
- **DPI Site**: The elevated area identified on the DPI site is capable of housing two large-scale commercial facilities side by side, facilitating expansion opportunities.

Precinct Scale Commercial scenarios test fitting.

Figure 51: Precinct-scale Commercial new build test fit / example at Bowen Aerodrome

FINANCIAL PROJECTIONS

- The facility is forecast to reach a net profit in year six (FY32) of operations, as the business reaches a scale that allows for efficiencies in production, and a reduction of overheads as a percentage of sales. By FY33, the business is expected to generate a net profit of just under AU$2m year-on-year, up to AU$2.06m in FY36.
- Operating cash flows aren't anticipated to reach positive until year four (FY30) of operations, driven by sales volumes. Overall cash flow during the pilot and ramp-up years will need to be supplemented with equity (up to AU$17.3m) to meet short-term cash requirements while the facility scales.
- The key capital expenditure required for the facility is the Freeze Dryer. This includes an entry-level machine at 100kg capacity (AU$390k) for years 1 – 2, a 600kg capacity machine (AU$1.6m) for years 3 – 4, and a 1.8 tonne capacity machine (AU$2.9m) for years 5 and beyond. Note production capacity upgrade timings in reality are subject to offtake agreements being secured before further expansion to mitigate financial and cash flow risks.
- The facility fit-out required for the pilot/establishment phase at an existing site is projected at AU$1.2m. A new build (22mx24m) food grade building on a flat site is estimated at AU$10.4m (assumed for commercial stage).
- By FY33, the facility's cost structure is expected to stabilise, with a 70% gross margin, 58% EBITDA margin, and 27% NPAT margin. Costs for the facility are largely driven by raw materials (~AU$1m), manufacturing wages (~AU$0.9m), and overhead wages (~AU$0.7m) – estimates for FY33 and beyond.

Financial Analysis Overview

A 3-way financial statement has been projected to test the financial viability of the proposed operations. The proposed operations for the purposes of the financial analysis include the sale of freeze-dried pieces, food powders, and bioactive extracts, and do not include the bioenergy and innovation hub. The analysis spans a 10-year period from FY27 to FY36. The report assumes that no financial outlay would occur until FY27 to allow for the appropriate planning and development timelines required to initiate the project. The following sections provide a summary of the base case and sensitivity analysis and a discussion relating to the key inputs and assumptions adopted in the financial analysis. The detailed 3-way financial statement can be found in Statement of Financial Position section.

Base Case Assumptions and Inputs

The following table represents a summary of the key inputs and assumptions included in the base case scenario.

Figure 52: Summary of the Key Inputs and Assumptions

Input	Description & Assumptions
Site and Development	The base case scenario involves leasing and developing a pre-existing site (potentially TAFE Bowen) to establish a pilot-scale facility, which will serve as the foundation for testing and initial production activities. The base case financials for the pilot facility take into account the necessary upgrades to make the existing site processing facility-ready, including fitting new interior walls, ceilings, ambient storage areas, and any other required food-safe elements. This also includes lease costs per square metre, construction costs, and other related expenses. (see detail in Appendix 1) The base case scenario is to remain at this site for two years (FY27-28), then construct a new facility offsite from the beginning of the small-scale commercial stage (FY29 to FY30), with financial costing examples including demolition and site preparation, substructure and column construction, roofing and external wall installation (detailed in Appendix 1).
Production Volume	Total freeze-dried production volume of 0.1t in year 1 and 1.9t in year 2 for Phase 1. Production of 9.7t in year 3 and 15.1t in year 4 for Phase 2. Production of 27t in year 5, with a gradual ramp up to 54t by year 10 for Phase 3. Volume has been estimated based on the facility's production capacity (i.e. how much produce can be processed through the freeze dryer at a given time) and the end product conversion rate. Production capacity is based on the milestone-based scaling and phased upgrades outlined in the previous section, with assumed ramp-up periods. The end product conversion rate has been estimated at ~9% (the final freeze-dried weight as a percentage of the original wet weight).

<table>
<tr><th>Input</th><th>Description & Assumptions</th></tr>
<tr><td>Production Mix</td><td>Assumes an even split of product inputs – 33% mango, 33% tomato, and 33% capsicum to standardise projections, however, this mix should be adjusted based on actual demand and market dynamics as the facility progresses.

For tomato and capsicum, where there are two product value streams once bioactive extraction is introduced in the business, a 50%/50% split has been assumed for lycopene powder/tomato powder and β-carotene powder/capsicum powder. Similarly, this mix should be adjusted based on offtake agreements secured in reality.</td></tr>
<tr><td>Sales Channel</td><td>Each product line type will vary in sales channels.

Freeze-dried Mango Pieces – In the initial two years, freeze-dried mango pieces will sell exclusively to distributors/co-packers to allow time for operational establishment and securing retail partnerships. Sales directly to retailers will commence in FY29, initially accounting for 10% of total sales, with a gradual increase to 50% by FY33, which is then maintained. Exports are assumed to be introduced in FY31, with export sales projected to grow to 20% of total sales by FY33.

Tomato/Capsicum Powder – Tomato/capsicum powder will begin sales to ingredient houses in the first two years of operations. As operations stabilise, sales directly to food manufacturers will commence, initially accounting for 10% of total sales, with a gradual increase to 30% by FY33. Exports are assumed to be introduced in FY31, with export sales projected to grow to 20% of total sales by FY33.

Lycopene/B-Carotene Oils – Bioactive compound extraction is anticipated to commence in FY30 if milestones are achieved. Sales are anticipated to only be channelled through pharmaceutical manufacturers. This will remain domestic until FY32, where export sales are projected to grow to 20% of total sales by FY34.</td></tr>
<tr><td>Sales Price</td><td>Projected sales prices for each product line are outlined below; however are indicative and subject to change based on further market discussions and contracts/negotiations.

Note that the sales prices below are based on the value per kilogram of freeze-dried product, when processed into pieces, powders, or bioactive extract oils. As such, the price for lycopene and β-carotene oils will increase as extraction efficiency is improved and compound yield from tomato and capsicum powders are maximised.
<table>
<tr><th></th><th>Sale to Distributor</th><th>Sale to Manufacturer</th><th>Sale to Retail</th></tr>
<tr><td>Freeze-dried Mango Pieces</td><td>AU$100/kg</td><td>N/A</td><td>AU$150/kg</td></tr>
<tr><td>Tomato Powder</td><td>AU$133/kg</td><td>AU$200/kg</td><td>N/A</td></tr>
<tr><td>Capsicum Powder</td><td>AU$169/kg</td><td>AU$254/kg</td><td>N/A</td></tr>
<tr><td>Lycopene Oil</td><td>N/A</td><td>AU$38/kg</td><td>N/A</td></tr>
<tr><td>B-Carotene Oil</td><td>N/A</td><td>AU$116/kg</td><td>N/A</td></tr>
</table></td></tr>
<tr><td>Cost of Goods Sold</td><td>Raw Materials

Produce input has been estimated at the following costs – Mango AU$0.9/kg, Tomato AU$1.3/kg, and Capsicum AU$2.06/kg; however, is subject to change once contractual agreements with growers are in place. Given the final product is ~9% of the raw input, the cost per kg of final product will reflect all raw input required to create the end product. For example, the cost of goods sold for 1kg of Freeze-Dried Mango Pieces is ~AU$10. Additional raw material required is Peracetic Acid Biocide, estimated at a cost of AU$0.13/kg produced.

Packaging

The cost of packaging for wholesale and export is estimated at AU$0.1/kg, and AU$0.8/kg for retail. The cost of a cardboard carton is estimated at AU$0.2/kg. Pallet and pallet wrap are estimated at AU$0.1/kg for all channels.

Freight

It is assumed that the facility will sell products to customers spread equally across VIC, NSW and QLD. A simple average of the freight cost to Melbourne, Sydney, and Brisbane has been adopted as the freight cost (AU$0.2/kg).</td></tr>
</table>

Input	Description & Assumptions
Employees/Wages	Manufacturing Staff Manufacturing Staff required for the pilot/establishment phase includes a supervisor (who will also manage health & safety, and quality assurance), and a process technician to run the machinery. As the business scales to multiple machines, additional process technicians will be required at varying levels (senior, trainee, etc.), up to five by FY36. A quality control/assurance technician will be required with the introduction of bioactive compound extraction in FY30. Corporate Staff During the pilot/establishment phase, the business will operate with a general manager (GM) and an administrative assistant, who will support sales processing, office administration, and planning. In FY29, a director of sales will be introduced to drive retail market entry and manage increased sales volume through production sales. By FY30, with the introduction of bioactive compounds, a product development manager will be added to oversee new product innovation and commercialisation.
Operating Costs	Other operating costs (excl. manufacturing and corporate wages) include the below: • Marketing & Advertising – assumed at 8% of retail sales • Professional Services – assumes an industry average of monthly accounting (~AU$650) and HR services (AU$100) • Audit and Compliance – assumes AU$12k annual cost • Freezer Container Rental – assumes an AU$540 cost monthly for pilot and AU$840 cost monthly for commercial
Trade Debtors	Trade debtors are calculated based on an average debtor days assumption. The base case assumes an average debtor days of 7 days for distributors/suppliers and 45 days for manufacturers/retail.
Trade Creditors	Creditor-debtor debtors are calculated based on an average creditor days assumption. The base case assumes an average debtor days of 30 days for inventory purchases and overheads.
Inventory Holding	Finished goods are calculated based on next month's forecast sales and the required level of stock to be held as at the end of next month. The base case assumes that only 3 days of finished goods are required to be held until the facility reaches a scale that requires advanced production to meet forecast demand in peak periods. Raw produce is assumed to be held up to 180 days for mangoes, 30 days for tomatoes, and 30 days for capsicum. The volume to be held is calculated based on the required production to meet the forecast finished goods balance.
Capital Expenditure	Capital expenditure for machinery and equipment is assumed as outlined in the previous section for the base case. The base case assumption for building follows Option 1 per the Master Precinct section, assuming fit-out at an existing site for the pilot/establishment stage and new build for the commercial stage. Deposits are assumed to be 25% of total cost with a lead time of 3 months. PPE and Building are anticipated to depreciate over 10 years.
Debt	The base case assumed no debt finance through bank loans.
Equity	The base case assumed no equity financing.
Tax & GST	The model assumes a 27.5% base rate entity tax rate or a standard tax rate of 30%. Tax losses are carried forward and offset against tax payable. GST is not included in the model.
Inflation	Inflation of 2.5% has been assumed year-on-year.
Land Lease Cost	$1.1 per sqm/month for land only $2.1 per sqm/month for land with existing build

Stage Gates and Milestone Scaling – Capital Expenditure

The financial analysis underpinning this business case is based on a 10-year forecast (FY27- 36), with key stage gates and milestones tied to production capacity upgrades and expansion of product lines that expand revenue opportunities. The financial analysis assumes that these milestones will be met as projected, adopting a phased investment approach that optimises financial feasibility. However, in reality, scaling decisions should be demand-driven, and governed by the ability to secure offtake agreements for greater volumes and/or additional product lines before further investments. Premature scaling without guaranteed demand could significantly impact financial stability and cash flow. Note, the financial analysis has assumed there are adequate supply

commitments from regional growers, and adequate capital and operational capability to progress scaling if demand permits; however, this should also be taken into consideration. The following outlines the phased approach to production scaling:

Phase 1: Establishment and Pilot Operations – 100kg Capacity (FY27-28)

The business will commence operations in FY27, with an entry-level freeze dryer (example sourcing from Cuddon), capable of processing 100kg of produce (mangoes, tomatoes, capsicum) per day. As FY27 will primarily focus on machinery and equipment procurement, facility setup, and operational establishment, production is projected to begin at 25% capacity in Q4 FY27.

FY28 will be dedicated to stabilising operations (process and workforce optimisation), reaching the full 100kg/day processing capacity by financial year end. *Note: Given that freeze drying reduces wet produce to approximately ~9% of its original weight, a 100kg capacity machine will yield an output of ~9kg of end product per day.*

Phase 2: Commercial Expansion – 700kg Capacity & Introduction of Bioactive Compound Extraction Machinery (FY29-30)

To establish commercial operations, a 600kg capacity machine can be procured, reaching a maximum capacity of 700kg for the facility when combined with the existing 100kg capacity machine from Phase 1. Addition of a 600kg capacity freeze dryer in FY29 will be contingent on securing offtake agreements to supply the increased production output. A ramp-up period is projected, reaching the full 700kg/day capacity by the end of FY29 with operations stabilised in FY30. As such, the required sales volume projected is approximately 9.7 tonnes of total sales volume in FY29, and 15.1 tonnes in FY30.

FY30 may also mark the potential introduction of bioactive compound extraction (i.e. lycopene and β-carotene) using specialised machinery – a supercritical fluid extractor and an ultrasonic bath. This investment should only proceed if sufficient offtake agreements are secured for the bioactive compounds.

Phase 3: Scaling Capacity – 2.5 tonne Capacity (FY31-36)

The next volume upgrade to adding a 1.8 tonne capacity freeze dryer will only be pursued once sufficient contractual commitments, for freeze-dried pieces, food powders, and potentially bioactive extracts, are in place to support production at this scale. Assuming demand aligns with capacity, the business can reach 2.5 tonnes/day production capacity by Q3 FY32. Once this milestone is achieved, operations will focus on maintaining full production at this level for the following four years. Future expansion opportunities based on market conditions and demand trends should be evaluated during this period.

Figure 53: Capex Timeline Summary (AU$)

Capex	FY27	FY28	FY29	FY30	FY31
Phase 1: Establishment and Pilot Operations					
Fit Out of Existing Facility at TAFE Bowen (refer to Appendix 1 for details)	$1,212,580				
Freeze Dryer (100kg Capacity)	$390,000				
Stainless Steel COP Wash Tanks	$22,000				
Centrifugal Juicer	$22,000				
Vegetable Preparation Machine	$2,000				
Centrifuge	$28,000				
Blast Freezer	$6,000				
Vacuum Sealing Machine	$2,000				
Phase 2: Commercial Expansion & Introduction of Bioactive Compound Extraction Machinery					
New build 22m x 24m food grade building on a flat site (refer to Appendix 1 for details)			$10,374,470		
Freeze Dryer (600kg Capacity)			$1,600,000		
Linear Weigher			$19,000		
Automatic Pouch Bagging Machine			$63,000		
Blast Freezer			$538,000		
X-ray Machine			$110,000		
Conveyor Belt & Feeder			$40,000		
Supercritical Fluid Extractor				$220,000	

Capex	FY27	FY28	FY29	FY30	FY31
Ultrasonic Bath				$9,000	
Phase 3: Scaling Capacity					
Freeze Dryer (1.8 tonne Capacity)					$2,900,000
Vegetable Preparation Machine					$2,000
Total Capital Expenditure	**$1,684,580**	**-**	**$12,744,470**	**$229,000**	**$2,902,000**

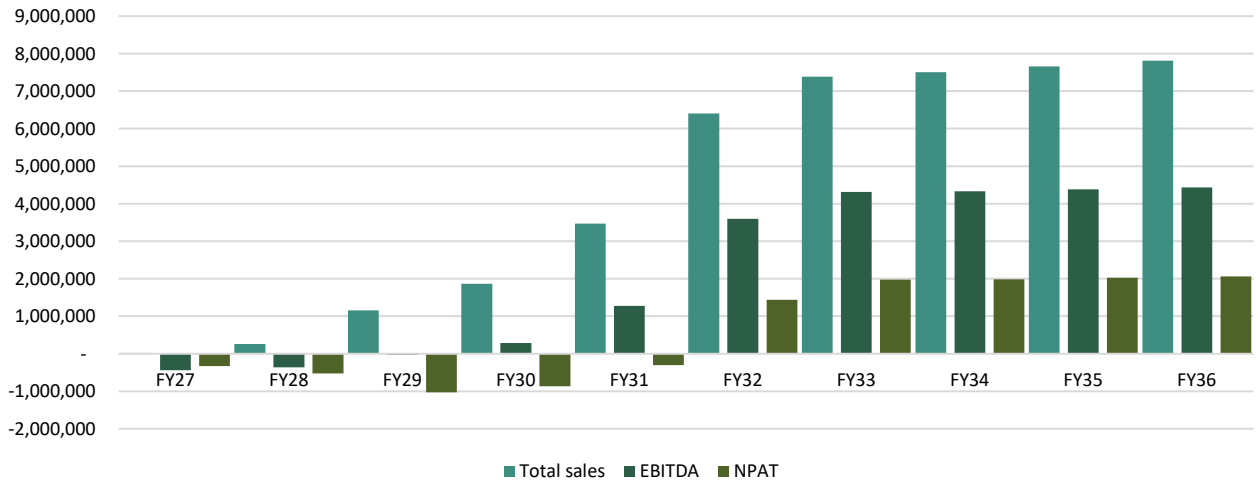
Financial Analysis Findings

Forecast Sales and Earnings

Under the base case assumptions, the facility commences operations in July 2026 and annual profit becomes positive in FY32. The first two years reflect the gradual ramp-up and stabilisation of operations, with the following years driven by increased production capacity and a reduction of overheads as a percentage of sales. The base case forecasts total annual sales volume to grow from 135kg in FY27 to 27.0 tonnes by FY31, and 54.0 tonnes in FY36.

The following chart presents a summary of the facility base case revenue and earnings.

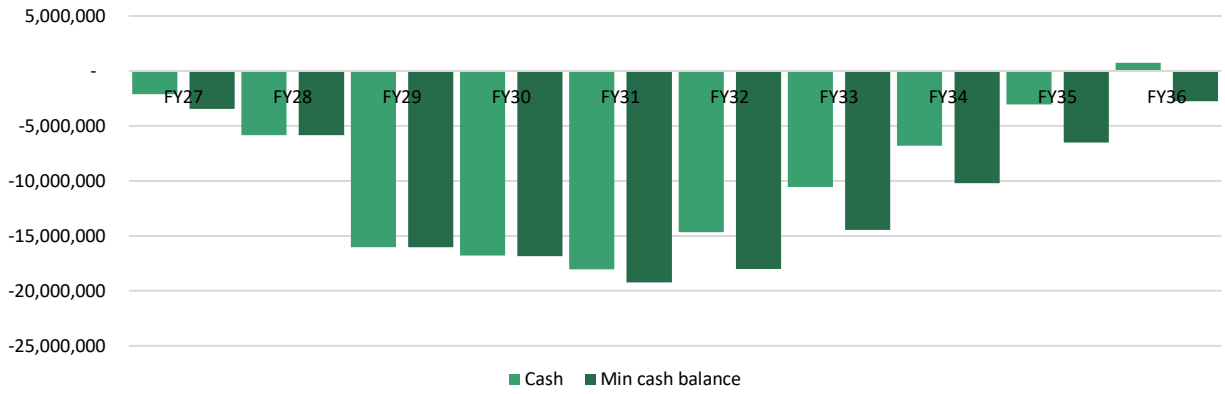
Figure 54: Forecast Sales and Earnings (AU$)



Cash Flow

The analysis indicates that while the business scales up, operating cash flows alone will be insufficient to cover all expenses, necessitating supplementary funding to sustain operations. Additionally, the business is projected to require substantial capital expenditure during years 1, 3, and 5, primarily driven by necessary upgrades in freeze dryer machinery and the costs associated with new construction projects. These investments are crucial for enhancing processing capabilities and accommodating increased production volumes as the business expands.

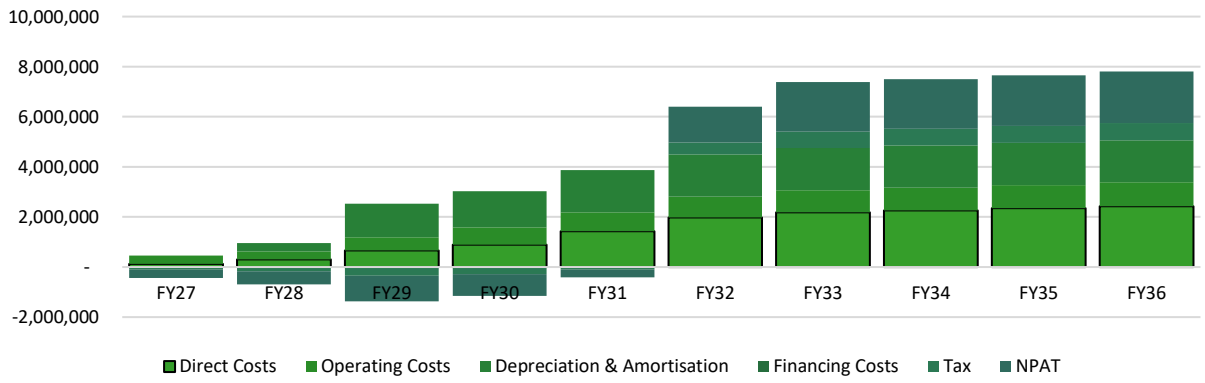
Figure 55: Cash Balance (AU$)



Cost Profile

The cost structure of the facility is expected to stabilise by FY33, with gross margin settling at approximately 70%, EBITDA at approximately 58%, and NPAT margin at approximately 27%. Direct costs are largely made up of raw material costs (~43%) and manufacturing wages (~40%), whilst operating costs are largely made up of overhead wages (~98%). The cost profile highlights the facility's ability to achieve operational efficiency over time, leveraging economies of scale while maintaining a competitive margin.

Figure 3: Cost Profile (A$)



Sensitivity Analysis

We have run a sensitivity analysis with four scenarios against the different site options; in addition to the base case described above, the following scenarios have been used for the Bowen Food Futures Precinct horticultural processing facility to test the financial outcomes of each:

- **Low volume case** – A 20% decrease in sales volume, all else is held constant. This increases the need for short-term cash flow by another year (from FY29 in the base case to FY30).
- **High volume case** – A 20% increase in sales volume, all else is held constant. This results in a better cash position by reducing the requirement for short-term cash by one year (to FY28).
- **Low price case** – A 20% decrease in sales price, all else is held constant. This increases the need for short-term cash flow by two years (to FY31).
- **High price case** – A 20% increase in sales price, all else is held constant. This results in a better profit; however, the short-term cash requirement would remain until FY29.

These scenarios allow for a comprehensive analysis of different strategies and their financial implications for the Bowen Food Futures Precinct. These scenarios allow for an analysis of different strategies and their financial implications for the Bowen Food Futures Precinct.

Site and Development Options Assessment

In addition to the base case site development strategy outlined above, three other site options were evaluated for their financial and timeline viability and feasibility. The other site options, Cost 2, Cost 3 and Cost 4a, were ultimately deemed **NON-PREFERRED** due to a variety of reasons. The options explored and their relevant rationale are as follows:

Cost 1 - Fit out of existing facility at TAFE Bowen:

- **BASE CASE OPTION:** This option provides an affordable way to establish the pilot facility due to the low cost required to fit out the TAFE facility, as opposed to building and fitting an entire facility offsite. This option was recommended by industry experts. The base case option entails remaining at the TAFE Bowen site from FY27-FY28.

Cost 2 - Build out the undercroft of the existing roof structure at TAFE Bowen:

- **NON-PREFERRED OPTION:** This option was to build upon the TAFE site and conduct the "small-scale commercial site" there instead of implementing Cost 4b. However, this option is less feasible due to the capital expenditure required for only a short extra duration stay at TAFE (FY29-FY30), as well as the potential conflict arising with TAFE regarding the scale of a commercial facility on their land as opposed to a pilot plant.

Cost 3 - New build 10m x 20m food grade building on a flat site:

- **NON-PREFERRED OPTION:** This build is to accommodate the small-scale commercial facility offsite. However, given this stage is only designed to last for two years (FY29-FY30), the capital involved is not feasible when compared to the establishment of a large-scale facility instead of transitioning through both.

Cost 4a - New build 10m x 31m food grade building on a flat site:

- **NON-PREFERRED OPTION:** This site was initially costed to represent what the large-scale facility would be fitted as. However, it was deemed that more space would be required for operational functionality.

Cost 4b - New build 22m x 24m food grade building on a flat site:

- **BASE CASE:** The base case scenario for after the TAFE Bowen site, from FY39 onwards. The new build will initially house the small-scale commercial plant. Although the small-scale commercial facility does not require as much space as the new build would provide, it is more economical to grow into this space over time. This approach avoids the need to create two separate plants—one for the small-scale commercial and another for the large-scale commercial. By designing the facility to transition from accommodating a small-scale operation to a large-scale one, it optimises space utilisation and capital expenditure effectively.

Figure 57: Development Scenario Options Cost Estimates (AU$)

Development Scenario Options Cost Estimates (AU$)					
Description	**Building GFA (m2)**	**Total Construction Cost**	**TCC / m2**	**"Total Project**	**TPC / m2**
Cost 1 - Fit out of existing facility at TAFE Bowen	182	$829,800	$4,560.00	$1,212,580	$6,660.00
Cost 2 - Build out the undercroft of the existing roof structure at TAFE Bowen*	104	$360,350	$3,460.00	$564,100	$5,420.00
Cost 3 - New build 10m x 20m food grade building on a flat site	200	$4,118,100	$20,590.00	$6,446,350	$32,230.00
Cost 4a - New build 10m x 31m food grade building on a flat site	310	$5,043,390	$16,270.00	$8,457,080	$27,280.00
Cost 4b - New build 22m x 24m food grade building on a flat site	528	$6,186,840	$11,720.00	$10,374,470	$19,650.00

Economic Impact

The Bowen Food Futures Precinct involves significant development with several phases. The new facility includes key initial investments and operational expectations, which have been calculated at a high level to determine some key economic impact potentials as follows:

Figure 58: High-level Economic Impact Overview

AU$11.6 million

Direct Economic Impact from Site Constructions:

AU$1.2 million

Additional Salaries of Community Jobs Created:

AU$3.64 million

Induced Economic Impact from the Large-Scale Commercial Facility

Project Overview

The new facility involves an initial capital investment of **AU$1.2 million** to establish the pilot site, with the facility initially employing 4 full-time roles. This will scale up to **11 full-time roles** in large-scale commercial operations, along with an additional **AU$10.4 million** in capital investment for site development.

Direct Economic Impact

Construction Phase:

There will be a total expenditure of AU$1.2 million for the pilot/establishment phase and AU$10.4 million for the commercial phase. It will create over 30 temporary construction jobs and contribute AU$6 million in wages.

Operational Phase:

Once fully operational, the facility will employ 11 full-time staff during the large-scale commercial scale of the facility, with an average annual salary of AU$105,818, contributing AU$1.2 million annually in wages. The operational staff requirements for each phase are as follows:

- **Pilot Scale:** 4 full-time staff with total salary costs of AU$477,000.
- **Small Scale Commercial:** 7 full-time staff with total salary costs of AU$797,000.
- **Large Scale Commercial:** 11 full-time staff with total salary costs of AU$1.2 million.

Indirect Economic Impact

The pilot facility at the TAFE Bowen generates a total indirect economic impact of AU$600,000. Meanwhile, the large-scale commercial facility offsite results in a total indirect economic impact of AU$5.2 million. These impacts illustrate the broader economic benefits created through secondary spending associated with each project's activities. Equally, the large-scale facility will generate a total indirect economic impact of AU$600,000 annually.

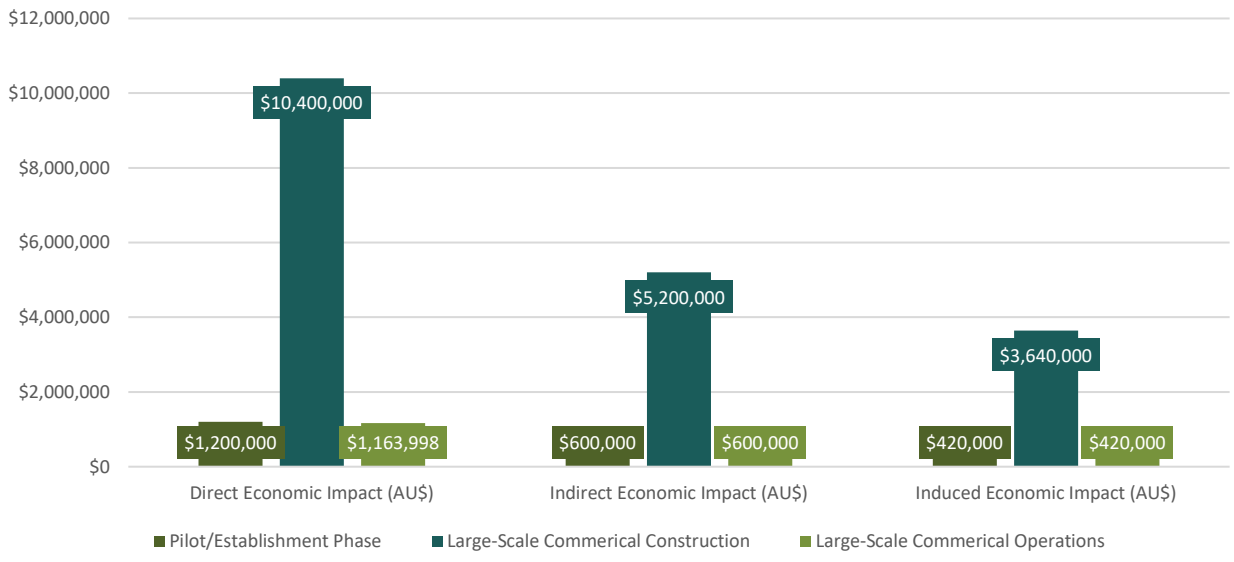
Induced Economic Impact

The pilot facility at the TAFE Bowen contributes a total induced economic impact of $420,000. The large-scale commercial facility leads to a total induced economic impact of AU$3.6 million. The large-scale commercial facility will have a further induced economic impact of AU$420,000 annually. These figures highlight the significant ripple effects on the economy driven by the ongoing spending patterns of employees and other entities involved in each project.

Total Economic Impact

The combined economic impact of the development projects at TAFE Bowen and the new food-grade building is substantial. The direct investment of AU$1.2 million in the pilot phase and AU$10.4 million for large-scale operations not only contributes significantly to local employment and wages but also generates notable indirect and induced benefits. The TAFE Bowen project and new food-grade building collectively lead to an additional AU$3.6 million in the supply chain.

Figure 59: Direct, Indirect and Induced Economic Impact of the Pilot and Commercial Offsite Facility (AU$)



Note 1: The graph above represents high-level estimates based on the initial scoping of site construction (see Appendix 1 for details) and wages (see Operating Plan for personnel breakdown).

Long-Term Projections

Over a 10-year period, the Bowen Food Futures Precinct facility's operations are projected to generate substantial economic benefits, with sustainable employment and consistent revenue growth. When analysing the potential economic benefits of the larger scale Food Innovation Precinct WA, the following insights emerge:

Economic modelling for the Food Innovation Precinct WA indicates that it may increase Western Australia's food and beverage sector output by between one to three percent in the first five years of operation.[107] This translates into the creation of 17 to 51 new food businesses, delivering various benefits to the Western Australian economy, including:[108]

- Growth in WA's food and beverage sector output by between AU$110 million and AU$330 million.[109]
- An economic injection of between AU$245 million and AU$737 million in other economic sectors.[110]
- Direct job creation of between 169 and 506 jobs.[111]
- Indirect job creation of between 323 and 977 jobs.[112]

These projected benefits from the Food Innovation Precinct WA serve as an example of what could possibly be anticipated from the Bowen Food Futures Precinct, highlighting its potential impact on the local and regional economy.

Profit/Loss Statement (FY27-FY36)

Figure 60: Profit/Loss Statement (FY27-FY36, AU$)

	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Revenue										
Distributor	18,090	259,592	768,969	1,171,803	1,646,116	2,853,796	2,202,258	2,257,314	2,313,747	2,371,591
Manufacturer	-	-	339,211	540,853	1,214,967	2,100,482	2,865,023	2,771,896	2,841,194	2,912,224
Retailer	-	-	48,600	151,200	405,000	972,000	1,350,000	1,350,000	1,350,000	1,350,000
Export	-	-	-	-	199,481	480,948	966,906	1,122,880	1,150,952	1,179,726
Total Sales	**18,090**	**259,592**	**1,156,780**	**1,863,857**	**3,465,564**	**6,407,226**	**7,384,186**	**7,502,091**	**7,655,893**	**7,813,540**
Direct Costs										
Ingredient Costs	(2,013)	(29,602)	(139,482)	(227,956)	(427,672)	(808,780)	(944,139)	(991,936)	(1,042,153)	(1,094,912)
Packaging	(54)	(775)	(6,944)	(11,452)	(22,352)	(41,240)	(49,890)	(49,640)	(50,881)	(52,153)
Freight	(14)	(204)	(1,342)	(2,139)	(3,681)	(6,503)	(6,912)	(6,747)	(6,916)	(7,089)
Manufacturing Wages & On-Cost	(126,553)	(259,433)	(465,064)	(566,746)	(827,674)	(848,366)	(869,575)	(891,315)	(913,597)	(936,437)
Other	(3,075)	(12,146)	(53,582)	(83,997)	(151,664)	(277,648)	(315,900)	(323,798)	(331,893)	(340,190)
Total Direct Costs	**(131,708)**	**(302,160)**	**(666,414)**	**(892,291)**	**(1,433,043)**	**(1,982,536)**	**(2,186,416)**	**(2,263,435)**	**(2,345,440)**	**(2,430,781)**
Gross Profit	**(113,618)**	**(42,568)**	**490,366**	**971,566**	**2,032,521**	**4,424,690**	**5,197,770**	**5,238,655**	**5,310,453**	**5,382,760**
Operating Costs										
Marketing & Advertising	-	-	(4,085)	(13,026)	(35,764)	(87,978)	(125,247)	(128,378)	(131,588)	(134,877)
Occupancy	(7,560)	(7,749)	(13,868)	(14,215)	(14,570)	(14,935)	(15,308)	(15,691)	(16,083)	(16,485)
Professional Services	(7,800)	(7,995)	(8,195)	(8,400)	(8,610)	(8,825)	(9,046)	(9,272)	(9,504)	(9,741)
Audit & Compliance	(21,000)	(12,300)	(12,608)	(12,923)	(13,246)	(13,577)	(13,916)	(14,264)	(14,621)	(14,986)
Cold Container Rental	(6,480)	(6,642)	(10,590)	(10,855)	(11,126)	(11,405)	(11,690)	(11,982)	(12,282)	(12,589)
Overhead Wages & On-Cost	(278,750)	(285,719)	(468,579)	(626,783)	(672,969)	(689,793)	(707,038)	(724,714)	(742,832)	(761,402)

	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Total Operating Costs	**(321,590)**	**(320,405)**	**(517,925)**	**(686,201)**	**(756,284)**	**(826,512)**	**(882,244)**	**(904,300)**	**(926,908)**	**(950,081)**
EBITDA	**(435,208)**	**(362,973)**	**(27,558)**	**285,365**	**1,276,237**	**3,598,178**	**4,315,526**	**4,334,355**	**4,383,546**	**4,432,679**
Depreciation	-	(334,730)	(1,345,080)	(1,443,647)	(1,683,890)	(1,683,890)	(1,683,890)	(1,683,890)	(1,683,890)	(1,683,890)
EBIT	(435,208)	(697,702)	(1,372,639)	(1,158,282)	(407,653)	1,914,288	2,631,636	2,650,465	2,699,656	2,748,789
Interest Expense	-	-	-	-	-	-	-	-	-	-
NPBT	(435,208)	(697,702)	(1,372,639)	(1,158,282)	(407,653)	1,914,288	2,631,636	2,650,465	2,699,656	2,748,789
Income Tax	108,802	174,426	343,160	289,571	101,913	(478,572)	(657,909)	(662,616)	(674,914)	(687,197)
NPAT	**(326,406)**	**(523,277)**	**(1,029,479)**	**(868,712)**	**(305,740)**	**1,435,716**	**1,973,727**	**1,987,849**	**2,024,742**	**2,061,592**

Cash Flow Statement (FY27-FY36)

Figure 61: Cash Flow Statement (FY27-FY36, AU$)

	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Operating Cash Flow										
Receipts from Customers	16,702	256,001	1,099,199	1,818,622	3,342,067	6,204,988	7,255,820	7,512,516	7,646,267	7,803,674
Payment of Inventory and Packaging	(2,665)	(35,058)	(162,767)	(247,980)	(471,461)	(889,409)	(977,426)	(1,008,158)	(1,058,995)	(1,112,203)
Payment of Overheads	(42,714)	(46,070)	(96,099)	(142,420)	(225,004)	(399,562)	(487,310)	(502,376)	(514,935)	(527,808)
Payment of Employees	(405,303)	(545,151)	(933,643)	(1,193,529)	(1,500,643)	(1,538,159)	(1,576,613)	(1,616,028)	(1,656,429)	(1,697,840)
Payment of Taxes	-	-	-	-	-	-	(205,126)	(644,408)	(693,920)	(706,205)
Total Operating Cash Flow	(433,980)	(370,278)	(93,310)	234,693	1,144,960	3,377,859	4,009,346	3,741,546	3,721,988	3,759,618
Investing Cash Flow										
PPE	(471,177)	(622,377)	(1,928,750)	(985,665)	(2,402,430)	-	-	-	-	-
Furniture & Fittings	-	-	-	-	-	-	-	-	-	-
Buildings	(1,212,580)	(2,724,919)	(8,174,758)	-	-	-	-	-	-	-
Total Investing Cash Flows	(1,683,757)	(3,347,297)	(10,103,508)	(985,665)	(2,402,430)	-	-	-	-	-
Financing Cash Flows	-	-	-	-	-	-	-	-	-	-
Drawdown – Business Loan	-	-	-	-	-	-	-	-	-	-
Trade Finance – Draw Downs	-	-	-	-	-	-	-	-	-	-
Trade Finance – Repayments	-	-	-	-	-	-	-	-	-	-
Interest Received	-	-	-	-	-	-	-	-	-	-
Equity Raised	-	-	-	-	-	-	-	-	-	-
Total Financing Cash Flows	-	-	-	-	-	-	-	-	-	-
Net Cash Flow	**(2,118,660)**	**(3,716,651)**	**(10,196,818)**	**(750,971)**	**(1,257,470)**	**3,377,859**	**4,105,746**	**3,768,672**	**3,742,019**	**3,779,649**

Statement of Financial Position (FY27-FY36)

Figure 62: Statement of Financial Position (FY27-FY36, AU$)

	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Current Assets										
Cash	(2,118,660)	(5,835,312)	(16,032,130)	(16,783,101)	(18,040,571)	(14,662,712)	(10,556,966)	(6,788,295)	(3,046,276)	733,373
Retail Trade Debtors	1,388	4,978	14,747	22,473	31,569	54,730	42,235	43,291	44,373	45,483
Key Trade Debtors	-	-	47,812	85,322	199,722	378,799	519,660	508,179	516,723	525,480
Export Trade Debtors	-	-	-	-	-	-	-	-	-	-
Trade Debtors	1,388	4,978	62,560	107,795	231,291	433,529	561,895	551,470	561,096	570,962
Finished Goods	66	243	1,146	1,874	3,515	6,648	7,760	8,153	8,566	8,999
WIP	2,644	12,527	19,724	37,281	70,531	79,791	83,054	87,259	91,676	91,243
Raw Materials	5,546	28,358	44,587	84,278	159,443	180,376	187,754	197,259	207,245	206,265
Inventory	8,256	41,127	65,457	123,432	233,489	266,815	278,568	292,670	307,487	306,507
Capex Deposits Paid	-	3,347,297	61,618	800,810	-	-	-	-	-	-
Total Current Assets	**(2,109,017)**	**(2,441,909)**	**(15,842,494)**	**(15,751,065)**	**(17,575,791)**	**(13,962,368)**	**(9,716,503)**	**(5,944,154)**	**(2,177,693)**	**1,610,842**
Non-Current Assets										
PPE	471,177	471,177	2,960,686	3,207,159	6,410,399	6,410,399	6,410,399	6,410,399	6,410,399	6,410,399
Acc. Dep. PPE	-	(62,238)	(317,350)	(671,030)	(1,264,952)	(1,858,874)	(2,452,796)	(3,046,718)	(3,640,640)	(4,234,562)
Buildings	1,212,580	1,212,580	12,112,258	12,112,258	12,112,258	12,112,258	12,112,258	12,112,258	12,112,258	12,112,258
Acc. Dep. Building	-	(272,492)	(1,362,460)	(2,452,427)	(3,542,395)	(4,632,363)	(5,722,331)	(6,812,298)	(7,902,266)	(8,992,234)
DTA	108,802	283,228	626,387	915,958	1,017,871	539,299	-	-	-	-
Total Non-Current Assets	1,792,560	1,632,255	14,019,521	13,111,918	14,733,181	12,570,719	10,347,530	8,663,640	6,979,750	5,295,860
Total Assets	**(316,457)**	**(809,654)**	**(1,822,974)**	**(2,639,147)**	**(2,842,610)**	**(1,391,649)**	**631,027**	**2,719,486**	**4,802,057**	**6,906,702**

	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Current Liabilities										
Trade Creditors	9,895	39,200	48,415	89,502	169,426	143,431	132,606	138,243	144,167	134,044
Trade Finance	-	-	-	-	-	-	-	-	-	-
Income Tax Payable	-	-	-	-	-	-	9,884	55,218	56,243	57,266
Total Current Liabilities	9,895	39,200	48,415	89,502	169,426	143,431	142,490	193,461	200,410	191,310
Non-Current Liabilities	-	-	-	-	-	-	-	-	-	-
Business Loan	-	-	-	-	-	-	-	-	-	-
Total Non-Current Liabilities	-	-	-	-	-	-	-	-	-	-
Total Liabilities	9,895	39,200	48,415	89,502	169,426	143,431	142,490	193,461	200,410	191,310
Net Assets	**(326,352)**	**(848,854)**	**(1,871,389)**	**(2,728,649)**	**(3,012,036)**	**(1,535,081)**	**488,536**	**2,526,025**	**4,601,647**	**6,715,391**
Equity	-	-	-	-	-	-	-	-	-	-
Contributed Capital	-	-	-	-	-	-	-	-	-	-
Current Period Earnings	-	-	-	-	-	-	-	-	-	-
Retained Earnings	(326,406)	(849,683)	(1,879,162)	(2,747,874)	(3,053,614)	(1,617,898)	355,829	2,343,678	4,368,420	6,430,011
Total Equity	**(326,406)**	**(849,683)**	**(1,879,162)**	**(2,747,874)**	**(3,053,614)**	**(1,617,898)**	**355,829**	**2,343,678**	**4,368,420**	**6,430,011**

ADDITIONAL FUTURE VALUE PROPOSITIONS

A Bioenergy and Innovation Hub could potentially be incorporated into the full-scale commercial Bowen Food Futures Precinct.

A bioenergy hub could utilise anaerobic digestion for the production and utilisation of renewable energy derived from biological sources, while an innovation hub could be a collaborative space that provides resources and support for universities, industry, and other regional players to develop technologies and market strategies.

Figure 63: Potential for the Bioenergy Hub and Innovation Hub

Potential for the Bioenergy Hub	Potential for the Innovation Hub
AU$500k in potential energy earnings via reselling power back to the grid. [113]	**New value streams** can be created through partnerships with ongoing regional R&D efforts, such as TAFE Bowen's Agricultural Centre of Excellence. These collaborations could support new revenue streams, including agri-tourism and a wider range of processed products.
AU$4.5b investment by the Queensland Government into renewable energy infrastructure across the state. [114]	**Partnerships** with universities like James Cook University and the University of Queensland for collaborative research, internships, and access to cutting-edge technology.
10 ongoing jobs created via the anaerobic digester. [115]	**Collaboration** with stakeholders by creating forums and initiatives for knowledge sharing and improved communication, benefiting efforts like commodity consolidation.
14 Mt of methane was reduced from entering the atmosphere. [116]	**Diversification** by actively seeking to include a wider range of commodities in the region to enhance the facility's offerings.

Figure 64: The 'Ideal End Design' for the facility, including a Bioenergy and Innovation Hub

Bioenergy Facility

The region's abundant renewable energy resources and historical challenges in the energy sector present a unique opportunity for establishing a biofuel facility within the precinct. This initiative could reduce reliance on energy sources under heightened legislative focus and help achieve the State Government's goal of 50% renewable energy by 2030.[117]

Current State of the Region's Energy Landscape

Abundant Renewable Resources

Queensland receives an average of 300 days of sunshine a year, some of the world's highest solar exposure, strong winds and over 1.73 million square kilometres of land.[118] The availability of renewable energy sources, along with a state government push for economic diversification, is driving large-scale developments such as the Collinsville Green Energy Hub, Capricornia Energy Hub, and Mt Challenger Wind Farms.

Closure of Coal-fired Plants

Queensland is shifting from its historically dependence on coal-fired generators. The state aims to reach 70% renewable energy by 2032 and 80% by 2035.[119] As of June 2024, 27% of Queensland's electricity is from renewable sources, indicating significant potential for further investment to decarbonize the state.[120]

Opportunity for Biofuel

Given the abundance of renewable resources in Queensland, along with the state government's legislative and economic support through AU$4.5 billion in funding to partner with the private sector for commercial renewable energy projects, there is an opportunity to support the government's goal of 50% renewable energy reliance by 2030 through the construction of a biofuel plant in Bowen.[121]

There is a strong case for developing an anaerobic digester in Bowen, but key considerations include comparing the environmental benefits, financial incentives, and self-sustainability advantages against challenges like input quality, required capital investment, needed expertise for setup and operation, and legal and financial risks.

Figure 65: Potential Benefits and Drawbacks of the Bioenergy Hub

Potential Benefits	Potential Drawbacks
Self-Sustaining	**Input Quality**
Anaerobic digesters can be run using the biofuels they produce, making the process self-sufficient. The anaerobic digester requires around a third of the produced biogas to sustain the reactor.[122]	The type of reactor feed input needs to be considered. The feed needs to be continuous, meaning inconsistent operations within the main processing plant may limit its effectiveness.
Financially Viable	**Capital Investment**
Outputs such as excess biofuel/electricity that are not used to power the Bowen Food Futures Precinct and for organic fertiliser can be sold to third parties that require it, providing an additional revenue stream. The Jandakot Bioenergy Plant has the potential to generate AU$500,000 a year in selling power back to the grid, for example.[123]	The size and purpose of the reactor need to be considered, as this will have a high impact on cost. Regardless, plant setup will have a high initial capital cost, with the anaerobic digester tank pricing typically being between AU$620,000 and AU$7,760,000, depending on sizing.[124]
Renewable	**Expertise**
Anaerobic digestion has a positive impact on the environment as it treats organic waste matter, converting it into usable energy. According to Veolia, organic waste is a 14 Mt per year issue for Australia; if left untreated, it can release methane gas, having a global warming potential 30-80x more than carbon.[125]	Anaerobic bacteria require optimal conditions (pH, temperature, alkalinity, and salt levels) to efficiently convert organic matter into biofuels and are sensitive to changes. Therefore, experienced engineers and technicians are required for successful operations.
Local Community	**Business Risks**
The development of a new biofuel plant will result in more jobs, boosting the local community. A 2MW plant would generate around 10 new jobs.[126]	The development of a new biofuel plant could result in added business, legal, environmental and financial risks.

Anaerobic digesters have had positive impacts when implemented successfully in various regions of Australia.

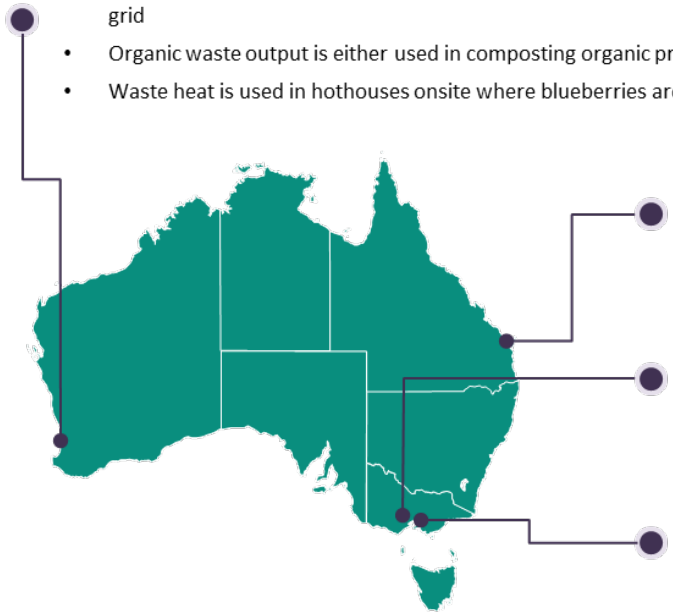
There have been a range of successful implementations of anaerobic digesters in Australia, most notably the Jandakot Bioenergy Plant, which has achieved an abatement of more than 140,000 tCO_2-e, as well as the projects by GAIA EnviroTech and Yarra Valley Water:[1]

Figure 66: Successful Implementations of Anaerobic Digesters in Australia

Jandakot Bioenergy Plant: The Jandakot Bioenergy Plant, located in Western Australia, is a 2MW anaerobic digestion plant that can process over 35,000 tonnes of waste each year for the major garden products supplier Richgro. The plant takes organic waste from breweries, chicken farms, supermarkets and other food suppliers. The plant build took four years (2011-2015) to become fully operational with an overall capital spend of $8 AU$ million and a payback period of four years.

Operation of the digester has been viewed as a success as it has:

- Estimated abatement of more than 140,000 tCO_2-e over a 20-year lifespan
- Produces sufficient energy to power Richgro's facilities and accompanying operations, with surplus energy sold to the power grid
- Organic waste output is either used in composting organic products onsite or provides organic content for farming soils
- Waste heat is used in hothouses onsite where blueberries are grown out of season.



Energy350: The Energy360 plant (which is currently under production) will collect waste from horticulture, industrial food processing and household food waste to create biogas. Bundaberg was selected at the region of choice due to it being a major horticultural region.

Gaia Envirotech: The Gaia Envirotech configurable anaerobic digester is located on a fully robotic dairy farm and uses dairy effluent to treat around 5,000 – 20,000 tonnes per year. The tank unit is 160 m3 and the energy output produced was 1575 kWh per day, equating to AU$37,000 worth of electrical energy produced each year.

Yarra Valley Water: The YVW Wollert facility processes fats, grease, fruit and vegetables as well as waste from animal processing facilities. The anaerobic digester sits next to YVW's Aurora sewage treatment plant, helping generate enough energy for both the facility and treatment plant, with the rest being sold to the grid.

***Source**: Clean Energy Finance Corporation – Richgro Green Thumb Grows Green Power. Australia Renewable Energy Agency – Jandakot Bioenergy Plant. Australian Manufacturing Technology Institute Limited – Gaia EnviroTech.*

Food Innovation Hub

Developing a co-location hub for research and innovation in the Greater Whitsundays region could leverage local resources like TAFE, universities, and corporations, supporting growers by exploring additional processes not prioritised in the Bowen Food Futures Precinct. **Some key areas the hub could support, and their relevant benefits include**:

Figure 67: Key Areas the Innovation Hub Could Support

LEVERAGING EXISTING TAFE EXPERTISE, CAPABILITIES AND FACILITIES	ACCESSING EMERGING AND ONGOING UNIVERSITY EXPERTISE AND RESEARCH	OPPORTUNITY FOR A FURTHER RANGE OF VALUE-ADDING AND PARTNERSHIPS
Availability of skilled labour: Expertise is required to support processing requirements such as freeze drying and anaerobic digestion.	**Collaboration between academia and growers**: Help bridge disconnects between research and on-the-ground grower challenges and concerns.	**Further cross-industry engagement**: Support for collaboration across the entirety of the food supply chain, from farmers to markets.
Regional innovation: Outside expertise could generate revenue beyond fresh produce and tourism.	**Regional specific research and development**: Drive R&D specific to the Greater Whitsundays region.	**Expanding commodities for further value-adding**: Increasing the range of commodities processed at the facility.
This partnership could link the precinct with established and ongoing research and development specific to regional production, as well as the broader knowledge base of the TAFE network. *A partnership with TAFE Bowen could offer access to the facilities' Agricultural Centre of Excellence, automotive and engineering expertise and established facilities for co-working. The Agricultural Centre of Excellence at TAFE Bowen could equip the hub with cutting-edge technologies and methodologies specifically tailored to enhance regional agricultural productivity and sustainability. This equipment and site could help develop avenues outside of the traditional revenue streams for growers, exploring and testing agri-tourism innovations and emerging processed products.*	*Collaboration with nearby universities such as James Cook and the University of Queensland could help growers more readily access and contribute to academic and scientific resources, with the hub acting as a co-location facility.* *The partnership could allow for joint research projects, student internships and access to cutting-edge university-funded technology. These collaborations could help facilitate knowledge transfer and ensure the hub stays aligned with global trends in agricultural science, food technology, and sustainability.* *Universities could bring in a diverse pool of experts and innovative approaches to solve regionally specific problems in the food processing industry.*	*By engaging with regional stakeholders at all levels of the value chain, including suppliers, processors, distributors, and retailers, the hub can try and increase the amount of cross-collaboration currently occurring, reopen communication channels that are currently underutilised and push for better information sharing for mutual benefit among growers.* *The Innovation Hub could continuously look to integrate a broader range and supply of commodities for end products where possible. These could include both proven concepts where market demand allows, such as creating fruit syrup concentrate, or more complex processes such as converting biomass into fertiliser.*

Successful global food innovation hubs offer valuable insights. These centres have advanced agriculture and processing, providing a model for a Bowen innovation hub.

Figure 68: Globally Innovation Centre Examples and Outputs

Globally Innovation Centre Examples and Outputs	
EXAMPLE 1: Food Innovation Centre (Oregon State University, USA): This centre provides resources for food and beverage entrepreneurs to develop and commercialise new products. It includes pilot plants, laboratories, and support services to help businesses navigate the complexities of food production and regulatory compliance. **Key takeaway:** Assists across the food processing value chain by providing emerging technology.	**EXAMPLE 5: CSIRO Food Innovation Centre (Australia):** The centre facilitates industry access to extensive expertise, cutting-edge technologies, and innovation support. The centre collaborates daily with food, ingredient, and equipment manufacturing companies to implement advanced technologies. **Key takeaway:** Grants growers and processors access to emerging technology.

Globally Innovation Centre Examples and Outputs		
Key Output: Deployment of Radio Frequency Identification (RFID).		**Key Output:** Enzyme and protein modification, extraction of high-value ingredients from waste streams, and bioactive stabilisation.
EXAMPLE 2: Singapore Institute of Food and Biotechnology Innovation (SIFBI) (Singapore): *A hub focused on food and biotechnology research, this institute aims to address food security and sustainable production. It collaborates with industry partners to innovate in areas like alternative proteins and food safety.* ***Key takeaway:*** *Focuses on sustainable value-added ingredients, accelerating scale-up and market entry.* ***Key Output:*** *Food-tech solutions through advanced pilot-scale High Moisture Extrusion (HME) and High-Pressure Processing (HPP).*	***EXAMPLE 3: Food Innovation Precinct (Australia):*** *The AU$21.75 million Food Innovation Precinct in Western Australia is a state-of-the-art facility that helps develop new products and exports to support Western Australia's food and beverage manufacturing industry.* ***Key takeaway:*** *R&D centre, Innovation Hub and Food and Beverage Production.* ***Key Output:*** *Economic modelling indicates the Precinct could boost Western Australia's food and beverage sector output by 1% to 3% in its first five years*	***EXAMPLE 4: New Zealand Food Innovation Network (New Zealand):*** *Comprising four regional hubs, this network provides facilities and expertise to help businesses develop and scale food and beverage products. It offers pilot plants, R&D capabilities, and commercialisation support.* ***Key takeaway:*** *Offers a pathway to market through open-access food and beverage production facilities.* ***Key Output:*** *Support for startups, market growth strategies, new product trials and export manufacturing assistance.*

Source*: Food Innovation Precinct Western Australia. Food Innovation Centre (FIC). Singapore Institution of Food and Biotechnology Innovation. Food Innovation Network. CSIRO Food Innovation Centre.*

Figure 69: Design Principles in the Creation of the Bowen Food Innovation Hub

Design Principles in the Creation of the Bowen Food Innovation Hub, Based on Global Examples							
Grower-Centric Approach		**Collaboration and Partnerships**		**Research and Innovation**		**Market & Supply Chain Support**	
Engage local farmers and growers in the planning and decision-making process to ensure the hub addresses their specific needs and challenges. Provide tailored support and resources that empower growers to innovate and improve their practices.		Foster strong partnerships with universities, research institutions, government agencies, industry stakeholders, and local communities. Encourage collaboration through shared resources, joint projects, and knowledge exchange to drive innovation and growth.		Invest in research and development to explore new technologies, processes, and products in food production and processing. Create an environment that encourages experimentation, prototyping, and the adoption of cutting-edge innovations.		Assist growers and entrepreneurs in accessing new markets and establishing strong supply chains. Provide resources to help navigate regulatory requirements, quality standards, and distribution channels.	
EVIDENCED BY EXAMPLE 3		***EVIDENCED BY EXAMPLES 1, 2, 3, 4 & 5***		***EVIDENCED BY EXAMPLES 1, 2, 3, & 5***		***EVIDENCED BY EXAMPLES 3 & 4***	

THE WAY FORWARD

To proceed with the project, Stage 2 will focus on the detailed design and procurement phase. The primary tasks include socialising and formalising the governance model, securing long-term offtake agreements, and finalising the pilot facility site and leasing negotiations with TAFE Bowen. Concurrently, a comprehensive site master plan will be created, engineering requirements will be finalised, equipment procurement negotiations will be engaged, and necessary food safety and quality permits will be applied for. *The outputs from this phase will satisfy the requirements and obligations of milestone #2 of the REEF agreement.*

The final stage, Stage 3, will focus on achieving an operational pilot plant facility. The core aim is to ensure the construction and commissioning of the pilot facility are completed successfully, on budget, and on time. This will involve detailed project scheduling, securing necessary permits, compliance with zoning and safety regulations, and engaging with construction partners. *The outputs from this phase will satisfy the requirements and obligations of milestone #3 of the REEF agreement.*

It is important to note that while these activities represent the next steps for the facility, they are not necessarily conducted in sequential order. Some tasks may be conducted in parallel where necessary.

1 Socialising the Business Case and Business Plan Creation

1.1 **Engage with stakeholders to validate, review, and secure community support:** This process involves presenting the case to key stakeholders and conducting community engagement sessions with local Bowen residents, local council, government bodies and any other necessary parties involved in the project's further development.

1.2 **Present the case to TAFE Bowen** to understand TAFE's desired project approach, feedback on the details of the business case and gauge their interest in supporting the project further.

1.3 **Developing the Governance Model:** Utilising the business case, growers need to be informed to establish their risk appetite, willingness to invest capital, and overall satisfaction with the decisions and assumptions made. This ensures buy-in and support from key input suppliers and potential investors before continuing further with the facility's development. This includes engaging stakeholders in discussions to gather their feedback, conducting workshops or meetings to present the business case, and using surveys or other tools to gauge satisfaction and willingness to invest. Key governance model requirements that need to be mapped out include the establishment of key performance indicators (KPIs) to measure the success and effectiveness of the model, clear definitions of roles and responsibilities, alongside the creation of a governance charter. Equally, a detailed operating structure that outlines reporting lines workflow processes needs to be formulated.

1.4 **Formation of Governance Committee:** Establish a governance committee composed of representatives from key stakeholder groups. This committee will be responsible for oversight, strategic direction, and major decision-making processes regarding the facility's development and operations. The governance committee should have a clear mandate and authority to make decisions, and should meet regularly to review progress, address issues, and make necessary adjustments.

1.5 **Map out Commercial Arrangements**: Identify and establish key commercial arrangements necessary for the facility's operation. This includes contracts with suppliers, service agreements, partnership arrangements, and customer contracts. Develop a comprehensive plan that outlines the terms and conditions of these arrangements, including pricing, delivery schedules, quality standards, and performance expectations.

1.6 **Create a Comprehensive Project Plan**: Finalise the requirements and necessary steps for the Pilot facility. This plan should outline specific timelines and milestones for each phase, ensuring that resources, including personnel, equipment, and materials, are allocated efficiently. Key components of the project plan should include a detailed schedule, budget estimates, task assignments, and a risk assessment matrix. Engage stakeholders in the planning process to ensure all perspectives are considered and to foster a sense of ownership and commitment to the project.

2 Obtain Offtake Agreements:

2.1 **Conduct Needs Assessment, Product Alignment, and Secure Offtake Agreements:** Engage in discussions with potential customers to understand their needs, preferences, and requirements. Align the proposed products with their specific demands to ensure that the offerings meet market needs and provide value. Gather contacts from reputable mutual connections to facilitate effective communication with these companies. Enter into detailed negotiations to secure offtake agreements, focusing on establishing mutually beneficial terms and conditions, including pricing, delivery schedules, and contract duration.

2.2 **Formalise contracts:** Draft and finalise formal contracts based on the negotiated terms of the offtake agreements. Ensure that all legal and regulatory requirements are met, and that the contracts provide clear and enforceable terms.

3 Site Selection, Negotiation and Master Planning

3.1 **Site Selection and Confirmation:** Conduct evaluations and due diligence to select and confirm a strategically well-positioned site (with TAFE Bowen being the currently preferred option) from the potential options provided (or new options if they become available). Site Selection needs to consider the short-term option as well as the larger commercial option. These may be in different locations, however, given the potential timeframes to action the large commercial option, early consideration of a potential site and starting the planning and design processes may be warranted.

3.2 **Negotiation:** Begin negotiations with the preferred site location owner regarding the lease agreement, costings for the facility uplift, commercial arrangements, etc. Detailed steps should cover finalising the lease terms, including duration, rental rates, and renewal options, as well as negotiating costs for upgrading the facility to meet project requirements. Establish commercial terms such as payment schedules, responsibilities for maintenance and utilities, along with timelines for facility completion and operational start. Terms may include partnership arrangements with TAFE and commitment to a teaching/learning and development program. Ensure alignment with regulatory approvals and define an exit strategy, including termination conditions and obligations. Maintain ongoing consultations with key stakeholders, such as the Whitsundays Regional Council, to align the project with community and regulatory expectations.

3.3 **Enhanced Site Masterplans Development for preferred option(s):** Building on the level of detail created in Stage 1, the site masterplans in this stage should include more specific elements such as building footprints including internal and external features, trees, topography, access arrangements, loading and turn paths and other detailed features and proof or maintaining site operations. This increased level of detail provides clarity in demonstrating how the project can be realised and enables more accurate costings.

3.4 **Infrastructure and Utilities Planning:** Detailed site masterplans should be complemented by engineering and service assessments for infrastructure and utilities planning. This includes the layout for water supply, sewage, electricity, and communication networks, ensuring that all necessary services are efficiently integrated into the project.

3.5 **Community and Government Engagement:** Site plans are typically more useful for conveying proposed interventions to the community and/or government. These detailed plans help in visualising the project's impact and benefits, facilitating better communication and stakeholder buy-in.

4 Procurement Support

4.1 **Engineering Advisory:** Consult engineers to ensure the pilot facility meets technical specifications and provide continuous advice throughout the project.

4.2 **Equipment Procurement Support:** Procure necessary machinery and equipment, managing vendor negotiations and delivery schedules. This includes consulting technical advisory services (which can be the same as the engineering advisory entity) to ensure every piece of equipment chosen is fit for purpose and has the necessary secondary requirements (e.g., support infrastructure).

4.3 **Planning and construction approvals**: Support the engagement of development professionals to assist in documentation and relevant local authority approval requirements.

4.4 **Food Safety, Quality, and Other Permits:** Support the obtainment of requirements for necessary food safety certifications, quality standards, and additional permits outlined within the business case. To ensure these permits do not cause timeline delays, they should be applied for at the earliest possible time.

4.5 **Services and Utilities Connections:** Coordinate and ensure timely connection of essential utilities in compliance with local regulations.

APPENDICES

Appendix 1 – Methodology and Considerations

Methodology behind the selection of bioactive compound extraction

To determine the most advantageous process for the region, a four-step activity was conducted. Initially, a long list of potential processes and products was collaboratively developed with growers and validated through site visits and extensive research. Following this, multi-criteria Assessments (MCAs) were conducted to evaluate the processes and products. The process MCA focused on factors such as inclusivity of commodities, end channel options, capital investment, alignment to regional priorities, and execution complexity. Meanwhile, the product MCA assessed market size, global market potential, import market size and growth, competition, global market growth, and the leveraging of the regional brand for sales.

The two MCAs were then combined to match each process with its corresponding product, allowing for a comprehensive evaluation of inputs and market demand. This approach identified processes with strong input ratings and products with high market demand potential, ensuring a balanced prioritisation. Finally, stakeholder validation was sought from local SMEs, industry experts in Bowen, and the wider scientific community with expertise in bioactive compound extraction. This thorough process aimed to select the most beneficial process for the region, ensuring sustainable development and economic viability.

Four-step process for selecting bioactive compound extraction

Figure 70: Four-Step Process for Selecting Bioactive Compound Extraction

1	**Creation of a long list:**
•	**Industry Consultation**: A long list of potential processes and products was collaboratively developed with growers and the Bowen-Gumlu Growers Association. This collaborative effort ensured comprehensive input from key stakeholders.
•	**Site Visits**: This long list was heavily informed by site visits conducted at the initial stages of the project. Observations and insights gained during these visits were crucial in shaping the list.
•	**Desktop Research**: The list was further validated through extensive research. This research included reviewing industry reports, market trends, and technological advancements to ensure all potential processes and products were considered.
2	**Performed Multi-Criteria Assessments on the Long List**
•	**Creation of Two MCAs**: Two Multi-Criteria Assessments (MCAs) were conducted, with one focused on processes and the other on end products.
•	**A Range of Areas Considered**: The MCAs considered several factors, including process and product market share, growth potential, feedstock availability, upfront costs, Bowen's competitive landscape, and logistical constraints.
3	**Combining of the MCAs**
•	**Combining of MCAs:** The two MCAs were combined to match each process with its corresponding product, such as juicing with juice. This step ensured a holistic evaluation of both inputs and outputs.
•	**Inputs and Demand Examined**: This combined approach examined inputs, processes, and end markets to identify the processes and products offering the highest predicted regional benefits. It aimed to match processes with high feedstock availability to products with strong market demand.

4	Expert and Stakeholder Validation

- **Stakeholder Validation:** Validation of the prioritised process and product from stakeholders. Engaging stakeholders ensured that the selected processes and products were aligned with local needs and interests.
- **SME Scrutiny:** The outcome was scrutinised by SMEs and industry experts within Bowen. Local insights provided valuable perspectives on the feasibility and potential impact of the selected processes.
- **Scientific Community Input:** The wider scientific community, particularly those specialising in bioactive compound extraction, was also consulted. Scientific validation ensured that the chosen process was backed by credible research and expert opinion.

Key Considerations in the Percent's Business Processes

Key Insight:

- *Well-defined operational processes will ensure production efficiency and product consistency for the Bowen Food Futures Precinct.*

Bowen Food Futures Precinct will establish and maintain processes and procedures to manage its end-to-end operations. These processes will clearly define responsibilities and ensure continuity and consistency as the Precinct's operations expand. The processes span strategy, product development, supply chain, and manufacturing operations.

Figure 71 illustrates the key Level 1 and Level 2 processes that will be put in place. Highlighted processes are considered uniquely significant for Bowen Food Futures Precinct given its Design Principles and Operating Model, thus further information on what these processes need to contain is provided in Figure 72.

Figure 71: Bowen Food Futures Precinct Operations Processes

Level 1 Processes	Define Strategy	Plan to Operationalize	Schedule to Produce	Store to Fulfil	Maintain to Optimise
Level 2 Processes	**Define Overall Strategy**	**Collaborate with Customers**	**Manage Demand**	Execute Production Schedule	Inventory Execution and Management
	Define Operations/SC Strategy	Prototype and Test	**Schedule Production**	Manage Inbound Material Flow	Manage Inventory
	Manage Assets	Commercialise Product	Resource Allocation	Operate Transport and Distribution	Develop Maintenance Plan
	Define Strategic Sourcing	Develop Customer Service Strategy	Workforce Scheduling	**Quality Management**	Manage Work Orders

** Level 1 processes are high-level operations that define the broad, overall strategies and frameworks by which the organisation functions. These processes encompass the fundamental elements that guide the entire operation, ensuring that strategic goals and mission statements are realised through the execution of detailed activities.*

** Level 2 processes are the more detailed, actionable procedures that support and implement the Level 1 processes. These processes break down the high-level strategies into specific, manageable tasks and activities that staff members follow routinely to ensure day-to-day operations run smoothly.*

Some operational processes are uniquely significant to the Bowen Food Futures Precinct and are defined in further detail to ensure alignment with the Precinct's strategic objectives. Below are some critical processes.

Figure 72: Key Bowen Food Futures Precinct Processes Defined

Key Level 2 Process	Description	Key Elements	KPIs/Measures
Define Operations Strategy	A plan for resource allocation to support infrastructure and production that targets overall business objectives. Maximises production effectiveness while minimising costs.	Reviewed frequently and realigned based on performance and market data.	• Profit and cash flow • Sales growth • Operational efficiency • Customer feedback
Collaborate with Customers	A structured engagement with customers to understand demand requirements and receive feedback to ensure product delivery meets expectations.	Team incentivised for forecast accuracy through regular analytics reviews.	• Forecast accuracy • Customer feedback
Manage Demand	Ensure capacity and supply are sufficient to achieve business goals. Effective demand management reduces uncertainty and improves throughput efficiency.	Establish demand horizons and prioritise customer orders.	• Capacity utilisation
Schedule Production	Allocation of resources to create products. Scheduling should be managed based on resource availability, customer demand, and excess capacity.	Tight scheduling with buffer capacity and multi-week schedule publication.	• Production yield • Capacity utilisation
Quality Management	Processes and policies to meet and maintain excellence.	Implementation of a quality management system (ISO) with periodic sampling and QC measures.	• Inbound material quality checks • Adherence to QA plan

Full process breakdown for

Main area of operation and how these areas of operation change relative to the facility scale.

MAIN AREAS OF OPERATION		
PRODUCE ENTRY AND PREPARATION	PRODUCE PROCESSING	PACKAGING AND EXIT
SCALE OF THE FACILITY		
PILOT SCALE	SMALL-SCALE COMMERCIAL	LARGE-SCALE COMMERCIAL

PRODUCE ENTRY AND PREPARATION

Process Overview - Produce Entry and Preparation:

Produce is sourced from various farms within the region and delivered to the designated unloading area of the facility. Upon entering the facility, the produce is either stored in the cool room if there is a surplus beyond the day's throughput capacity or directed immediately to processing.

The produce is transported in its original farm-delivered bins. The bins are unloaded, washed, stored, and returned to the farms. A quality check is conducted, and any unsuitable produce is discarded in the waste area. Sanitisation follows, where the produce is washed and then prepared as required, including cutting, dicing, puréeing, and juicing. The juice extract can be directed to the probiotic juice value stream, while the remaining produce is manually placed on trays, blast frozen, and stored in the freezer for longer-term storage until throughput allows for further processing.

Pilot Scale - Produce Entry and Preparation:

The pilot facility relies mostly on manual labour due to the small throughput of 100kg per day. The initial facility will utilise trolleys and manual lifting for the majority of movement, including much of the sanitisation and preparation work, in conjunction with small-scale preparation equipment and wash tanks. The delivery and dispatch of product into and out of the facility will only require a small utility or light rigid vehicle.

Small Scale Commercial - Produce Entry and Preparation:

Due to higher throughput, forklifts may be required for unloading vehicles and moving produce between the processing areas. More conveyors and supporting machinery will be in place to handle the higher throughput of 700kg per day. Access for regular light rigid vehicles will need to be considered.

Large Scale Commercial - Produce Entry and Preparation:

Forklifts will be necessary to move produce in the initial stages of the process. Produce weight will be diminished during freeze-drying (Produce Processing), reducing the need for as much heavy lifting thereafter. Access for larger vehicles will need to be considered.

Note: The detailed process steps below pertain to a large-scale commercial facility. Due to the comprehensive nature of this scale, all value streams are included, covering every step. Please refer to the Operating Plan section for a breakdown of which value streams are incorporated at each scale, e.g., bioactive compound extraction is included at the small-scale commercial value streams.

Figure 73: Produce Entry and Preparation - Large Scale Commercial

PRODUCE ENTRY AND PREPARATION - LARGE SCALE COMMERCIAL			
VALUE STREAM	**STEP**	**STEP DETAIL**	**RELEVANT MACHINERY**
Generic Value Stream	**Farm Pickup**	Produce is picked up from the grower via truck	Truck / small utility vehicle for transportation from farm to facility
Generic Value Stream	**Entering Facility**	Produce is transported to the facility and unloaded into the designated entry point	Unloading docks for efficient offloading, conveyors for moving produce within the facility
Generic Value Stream	**Cool Room Storage**	Produce is stored in the cool room until it is ready for processing	Cool rooms for storing produce at controlled temperatures
Generic Value Stream	**Manual Bin Unloading**	Produce is unloaded from the bins	Manual handling equipment (hand trucks, dollies), automatic handling equipment (bin tippers, robotic arms)
Generic Value Stream	**Bins Washed & Stored**	Empty bins are washed and stored (off-shoot step)	Stainless Steel COP Wash Tank: 104 Gallon and 209 Gallon models; for use in high-pressure washing and sanitising
Generic Value Stream	**Quality Check**	Produce is checked for quality, with unsuitable produce discarded	Inspection and sorting tables for visual inspection and sorting conveyors for separating unsuitable produce
Generic Value Stream	***Unsuitable Produce***	*Discarded produce is sent to waste area (off-shoot step)*	*Waste conveyors for transporting discarded produce to waste area*
Generic Value Stream	**Sanitisation & Preparation**	Produce is sanitised then chopped, diced, pureed or juiced (depending on the produce)	Hallde RG-50 and RG-350 Vegetable Preparation Machines for chopping, dicing, pureeing
Generic Value Stream	***Wasted Components***	*Produce waste is sent to waste area (off-shoot step)*	*Waste conveyors for efficient waste management*
Generic Value Stream	**Manual Tray Loading**	Prepared produce is loaded onto IQF trays	Manual handling equipment for loading produce onto trays
Generic Value Stream	**Blast Freeze**	Produce is loaded into blast freezer and frozen rapidly	Roll-In Blast Chiller WMBC320 for rapid freezing
Generic Value Stream	**Freezer Storage**	Produce is kept in the freezer to ensure it remains frozen	Freezers for long-term storage of frozen produce

PRODUCE PROCESSING

Process Overview - Produce Processing:

When machine capacity and market demand allow, the produce is taken from the freezer, placed on trays, and put through the freeze-drying equipment. This process involves freezing the produce and then reducing the surrounding pressure to allow the frozen water in the produce to sublimate directly from the solid phase to the gas phase. As the produce goes through the freeze-

drying process, its weight is significantly reduced, making the remaining handling stages less dependent on heavy lifting equipment. Additionally, automated conveyance systems will likely be utilised to enhance efficiency and reduce manual labour. Freeze-drying is a primary process and a core component of three value streams: freeze-dried pieces, freeze-dried powders and bioactive compounds. Once the produce is freeze-dried, it can be stored as freeze-dried pieces for retail or wholesale. Alternatively, the freeze-dried produce can be crushed into fruit and vegetable powders. In later years, bioactive compounds such as Lycopene and β-carotene will be extracted from the freeze-dried produce for use in higher-value products.

Pilot Scale - Produce Processing:

The pilot facility's modest throughput of 100kg per day is mainly managed through manual labour. This includes manually moving trays and managing waste, as the operation's scale does not justify extensive automation or machinery. It will focus on the creation and optimisation of freeze-dried pieces and powders.

Small Scale Commercial - Produce Processing:

For small-scale commercial operations with a higher throughput of 700kg per day, the setup involves more machinery to accommodate the increased volume, balancing manual labour with mechanical assistance to ensure efficient processing.

Large Scale Commercial - Produce Processing:

Large-scale production will require much larger freeze-drying equipment, as well as more conveyor belts and less manual lifting due to the increased weight. As the produce goes through the freeze-drying process, its weight is significantly reduced, making the remaining handling stages less dependent on heavy lifting equipment.

Figure 74: Produce Processing - Large Scale Commercial

PRODUCE PROCESSING - LARGE SCALE COMMERCIAL			
VALUE STREAM	**STEP**	**STEP DETAIL**	**RELEVANT MACHINERY**
Generic Value Stream	**Juicing**	Produce is juiced, with the juice being further processed and the solid fraction sent for freeze drying	Santos 68X Centrifugal Juicer, Browns Juicer (Model 3600) for juicing
Probiotic Juice	**Liquid Fraction**	Pass the juice through a fine strainer or sieve to separate any remaining solid particles	Strainers and sieves to filter out solid particles
Probiotic Juice	**Enzyme / Centrifugal Clarification**	Clarification of liquids by removing suspended solids and other particulates	Santos 68X Centrifugal Juicer for thorough clarification, Browns Juicer (Model 3600) for additional clarification capabilities
Freeze-Dried Pieces	**Manual Freeze-Drying Tray Loading**	Pre-prepared produce is loaded onto trays	Manual handling equipment for safe loading, trays designed for freeze-drying
Freeze-Dried Pieces	**Freeze Drying Loading**	Trays are loaded into freeze-drying machinery	FD100GPC Freeze Dryer (100kg Capacity) for pilot scale batches FD600GPC Freeze Dryer (600kg Capacity) for small-scale commercial batches FD1800GPC Freeze Dryer for large-scale commercial batches
Freeze-Dried Pieces	**Freeze Drying**	Produce is freeze-dried for 18–22 hours	FD100GPC Freeze Dryer (100kg Capacity) for pilot scale batches FD600GPC Freeze Dryer (600kg Capacity) for small-scale commercial batches FD1800GPC Freeze Dryer for large-scale commercial batches
Freeze-Dried Pieces	**Freeze Dried Unloading**	Produce is unloaded from the freeze dryer	Manual handling equipment, as well as conveyors and trollies, where necessary
Freeze-Dried Pieces	**Produce Removed from Trays**	Freeze-dried pieces are removed from the trays	Manual handling equipment to ensure delicate removal

PRODUCE PROCESSING - LARGE SCALE COMMERCIAL			
VALUE STREAM	**STEP**	**STEP DETAIL**	**RELEVANT MACHINERY**
Freeze-Dried Powder	**Powder Creation**	Freeze-dried pieces are converted into powder form	Grinders to finely powder the freeze-dried produce
Bioactive Compound Extraction	**Supercritical Fluid Extraction (SFE)**	CO_2 is used as an extraction fluid (utilising freeze-dried powders)	Supercritical Fluid Extractor (Small - Medium) for lower quantities, Supercritical Fluid Extractor (Large) for higher quantities
Bioactive Compound Extraction	**Dissolution and Testing**	The final extracted residue is dissolved in refined sunflower oil and tested for nutraceutical content	Lab testing equipment for accurate nutraceutical content testing

PACKAGING AND EXIT

Process Overview - Packaging and Exit:

Post-processing, the produce will enter the packaging area. Initially, in the early stages of the site's tenure, the packaging operation will be small-scale and manual, focusing primarily on wholesale packaging. This will involve bulk packaging of freeze-dried pieces, powders, and potentially probiotic juice in large containers suitable for transportation to wholesalers and other business customers. The retail packaging process will be developed and implemented in later stages as the facility expands its market channels and enters the retail sector.

Pilot Scale - Packaging and Exit:

At the pilot scale, the packaging and exit process will be highly manual. Workers will manually package the freeze-dried pieces and powders into bulk containers for wholesale distribution. The small scale of operations means packaging equipment will be minimal, focusing on simplicity and cost-effectiveness. Quality control checks will be performed manually to ensure that each package meets the required standards. Once packaged, the produce will be stored in a designated area, ready for despatch to wholesalers.

Small Scale Commercial - Packaging and Exit:

For small-scale commercial operations, the packaging area will include a combination of manual and semi-automated processes. While bulk packaging for wholesale remains a priority, the facility will start to introduce basic retail packaging processes. This will involve packaging freeze-dried pieces and powders into smaller, consumer-friendly packages, such as pouches. Semi-automated packaging machines will be used to improve efficiency and consistency. Quality control measures will be manual; however, an X-ray machine will be installed for food safety requirements as consumer packaging is introduced. The packaged products will then be organised and stored in a larger designated area, ready for distribution to both wholesale and emerging retail markets.

Large Scale Commercial - Packaging and Exit:

In large-scale commercial operations, with a significantly higher throughput, the packaging and exit process will be highly automated to handle the volume efficiently. Advanced packaging machinery will be utilised for both wholesale and retail packaging. Bulk containers for wholesale will be filled, sealed, and labelled using automated systems. Retail packaging will be fully developed, with automated lines for filling, sealing, labelling, and secondary packaging (such as boxing and potentially pelletising). This may include automated quality control systems to ensure every package meets and exceeds all food safety standards. The products will then be moved to a large, organised storage area, ready for distribution to wholesalers, retailers, and export markets.

Figure 75: Packaging and Exit - Large Scale Commercial

PACKAGING AND EXIT - LARGE SCALE COMMERCIAL			
VALUE STREAM	**STEP**	**STEP DETAIL**	**RELEVANT MACHINERY**
Probiotic Juice	**Probiotic Juice Moved to Packaging Area**	Juices are moved to packaging area	Packaging conveyors to transport juice to the packaging area
Freeze-Dried Pieces	**Freeze-dried Pieces to Packaging Area**	Pieces are moved to final packaging	Packaging conveyors to transport freeze-dried pieces

PACKAGING AND EXIT - LARGE SCALE COMMERCIAL			
VALUE STREAM	**STEP**	**STEP DETAIL**	**RELEVANT MACHINERY**
Freeze-Dried Powder	**Powders Moved to Packaging Area**	Freeze-dried pieces converted into powder form and moved to packaging area	Packaging conveyors to handle the transfer of powders
General Bulk Packaging	**General Bulk Packaging**	Bulk packaging is used to store produce utilised in wholesale and as an input to other products	Bulk packaging lines for efficient packaging of large quantities
Retail Packaging	**Retail Packaging**	Packaging intended to be delivered to an intermediary or direct to retail	Semi-Auto Tabletop Auger Filler 14L Hopper for precise filling, Triple Pan Linear Weigher 5L for accurate weighing
Probiotic Juice	**Specialised Probiotic Packaging**	Specialised packaging is used to store the probiotic tomato juice	Specialised packaging lines designed for probiotic products
Bioactive Compound Extraction	**Specialised Bioactive Compound Packaging**	Specialised packaging is used to store the bioactive extracted compounds	Specialised packaging lines for bioactive compounds
Probiotic Juice	**Cool Room Storage**	Probiotic juice is stored in the cool room	Cool rooms to provide temperature-controlled storage
Generic Value Stream	**Ambient Storage**	End products apart from bioactive juice are stored in ambient storage	Storage areas designed for ambient temperature maintenance
Generic Value Stream	**End Products Loaded and Depart**	The products are loaded onto the necessary trucks	Loading docks for loading, trucks for transportation

Development Scenario Options Cost Estimates

Figure 76: Development Scenario Options Cost Estimates

Development Scenario Options Cost Estimates (AU$) Date of Estimate: 27/03/2025					
Description	**Building GFA (m2)**	**Total Construction Cost**	**TCC / m2**	**"Total Project**	**Description**
Base Case: Cost 1 - Fit out of existing facility at TAFE Bowen	182	$829,800	$4,560.00	$1,212,580	$6,660.00
Cost 2 - Build out the undercroft of the existing roof structure at TAFE Bowen*	104	$360,350	$3,460.00	$564,100	$5,420.00
Cost 3 - New build 10m x 20m food grade building on a flat site	200	$4,118,100	$20,590.00	$6,446,350	$32,230.00
Cost 4a - New build 10m x 31m food grade building on a flat site	310	$5,043,390	$16,270.00	$8,457,080	$27,280.00
Base Case: Cost 4b - New build 22m x 24m food grade building on a flat site	528	$6,186,840	$11,720.00	$10,374,470	$19,650.00

Figure 77: Basis of Costs

BASIS OF COSTS
1.0 Introduction
1.01 KPMG has prepared a Rough Order of Magnitude indicative capital cost estimate for the proposed scenario options of the BGGA - Bowen Food Futures Precinct in Bowen, QLD.
2.0 Class of Estimate
2.01 This approximately represents a Class 5 estimate based on the AACE Classification System, with an expected accuracy of -20% to -50% on the low end, to +30% to +50% on the high end. The components of this cost plan will require further confirmation once further documentation is available.
3.0 Methodology
3.01 Cost estimates have been prepared based on an elemental estimating format. Direct construction costs have been scoped and priced on a per-unit basis based on similar project price data. Estimated allowances have been made for assumed scope items and are to be updated once the scope and design have been further developed.
3.02 Allowances for all indirect costs, including contractor preliminaries and overhead & margin, design costs, client costs, insurances, statutory fees, and contingencies, have been applied based on a percentage basis of construction cost. These percentages are informed by current market trends and professional judgement of the project scope. A locality factor which assesses area-specific cost variation has been applied based on Rawlinson's Australian Construction Handbook 2024 Regional Indices for Bowen, QLD.
3.03 Escalation percentage has been applied to project cost based on an aggregated indexation of 3.5% p.a. Escalation has been calculated for each cost scenario on the basis of assumed project completion dates outlined in Schedule 6.1 below.
4.0 Basis of Cost Plan
4.01 "The quantities used for these cost estimates are based on indicative scenarios outlined in the Bowen Master Plan Brief (draft) power point: Cost 1 internal area (13m x 14m) Cost 2 new internal area to under croft (13m x 8m) Cost 3 new build (10m x 20m) Cost 4a new build (10m x 31m) Cost 4b new build (22m x 24m)"
5.0 Site conditions
5.01 Assume clear access to the TAFE Queensland Bowen Campus site with no site contamination for Cost 1 and Cost 2 scenarios.
5.02 Assume a flat greenfield site located in Bowen, QLD, with no site contamination for Cost 3 and Cost 4 new build scenarios.
6.0 Schedule
6.01 "Assumed project completion dates: Cost 1 July 2027 Cost 2 July 2029 Cost 3 July 2029 Cost 4a July 2031 Cost 4b July 2031"
7.0 Risk
7.01 A detailed risk analysis for this project has not been conducted. In the meantime, contingency allowances have been made to cover the potential cost impacts of risks/uncertainties on the project in line with the Risk Engineering Society (RES) 2nd Edition Contingency Guidelines. It is recommended that, as the design progresses, further risk analysis is conducted and the contingency allowances updated to reflect the increased understanding of the project risk profile.
8.0 Assumptions
8.01 Refer to the elemental estimate for detailed assumptions
8.02 Estimate based on construction in situ, no prefabrication or modular construction elements
8.03 Contractor’s preliminaries of 20% have been applied to direct construction costs
8.04 Contractor’s margin of 10% has been applied to direct construction costs and contractors’ preliminaries
8.05 Locality factor of 18% for Bowen, QLD applied to direct construction costs
8.06 Design consultant fees of 10% have been applied to direct construction costs, contractors’ preliminaries and contractor’s margin
8.07 Insurances of 1.5% have been applied to Total Construction Cost (TCC)
8.08 Statutory Fees and Charges of 1.5% have been applied to Total Construction Cost (TCC)
8.09 Design contingency of 10% has been applied to Total Construction Cost (TCC)

8.10 Construction contingency of 10% has been applied to Total Construction Cost (TCC)
8.11 Site preparation based on greenfield sites with balanced cut and fill and disposal onsite if required
9.0 Exclusions
9.01 GST
9.02 Remediation of site decontamination or asbestos removal
9.03 Work outside site boundary
9.04 Abnormal ground conditions
9.05 ESD / Sustainability Initiatives
9.06 Client costs
9.07 Food processing equipment
9.08 Sustainability targets

Cost 1 - Fit out of existing facility at TAFE Bowen (AU$)

Figure 78: Cost 1 - Fit out of existing facility at TAFE Bowen (AU$)

Description	Qty	Unit	Rate	Total
Demolition / Site Preparation				
Carefully remove loose existing equipment, work benches, storage cupboards etc.	1	Item	$9,600.00	$9,600
Carefully remove existing fixtures, sinks, plumbing, lighting, fans, capping off existing services.	1	Item	$11,520.00	$11,520
Carefully demolish and dispose eastern & western side roller doors and exterior / interior metal cladding and interior face of northern & southern sides of shed.	1	Item	$16,600.00	$16,600
Carefully demolish and dispose internal area ceiling metal sheeting.	1	Item	$4,800.00	$4,800
Assume keep highlight window in place on northern & southern sides of shed.	Note			
Allowance for disposal	5	t	$500.00	$2,500
Site Excavation				
Site Excavation	1	Item	N/A	N/A
Substructure				
Assume concrete set downs not required	Note			
Substructure	1	Item	N/A	N/A
Columns				
Columns	1	Item	N/A	N/A
Upper Floors				
Upper Floors	1	Item	N/A	N/A
Stairs				
Stairs	1	Item	N/A	N/A
Roof				
Roof	1	Item	N/A	N/A
External Walls				

Description	Qty	Unit	Rate	Total
New exterior metal cladding to eastern and western sides of shed to match existing exterior cladding, assume 6m average height.	156	m2	$140.00	$21,840
Secondary steel	156	m2	$120.00	$18,720
New insulated interior face of exterior walls (new and existing) assume northern side 5m high, southern side 6m high, eastern & western 6m average height.	310	m2	$300.00	$93,000
Extra over for working around existing conditions	1	Item	$15,000.00	$15,000
External Doors				
New insulated food-grade double door between covered walkway and internal food processing area.	1	No	$15,000.00	$15,000
Double-leaf food-grade external door	1	No	$25,000.00	$25,000
Internal Walls & Screens				
Assume no internal walls & screens	Note			
Insulated interior face of external walls included in external walls.	1	Item	Incl.	Incl.
Internal Doors				
Assume no internal doors	Note			
Wall Finishes				
Included in external walls	1	Item	Incl.	Incl.
Floor Finishes				
Allowance to existing concrete floor preparation, i.e., levelling etc.	182	m2	$50.00	$9,100
Epoxy floor finish	182	m2	$160.00	$29,120
Floor coving	54	m	$90.00	$4,860
Ceiling Finishes				
New insulated plasterboard ceiling	182	m2	$220.00	$40,040
Extra over for working around existing conditions	1	Item	$10,000.00	$10,000
Fitments and FF&E				
Food processing equipment including freezer, cool room, ambient store, IQF blast freeze, freeze dryer, packaging equipment, stainless bench x 2, wet processing area equipment, immersion COP tank.	1	Item	Excl.	Excl.
Hydraulic Services				
Assume existing water and wastewater supply sufficient. No allowance for upgrading included.	Note			
Allowance to reconfigure hydraulic services	1	Item	$20,000.00	$20,000
Mechanical Services				
Plant and equipment capacity adequate to cover Cost 2 extension of internal area.	Note			
Allowance for industrial-scale air-conditioning including plant, equipment, supply, and installation.	1	Item	$140,000.00	$140,000
Electrical Services				

Description	Qty	Unit	Rate	Total
Assume existing electrical supply sufficient. No allowance for upgrading included.	Note			
Allowance to re-configure electrical services including lighting, power outlets, switches etc.	1	Item	$50,000.00	$50,000
Fire Services				
Allowance for fire extinguishers and portable fire hydrant	1	Item	$3,000.00	$3,000
External Works				
Ambient store concrete pads	3	No	$4,500.00	$13,500
External Services				
External Services	1	Item	N/A	N/A
Total Direct Cost				$553,200
Contractors Preliminaries		20%		$110,640
Contractors Margin		10%		$66,380
Locality Factor		18%		$99,580
Total Construction Cost				$829,800
Design Consultant Fees		10%		$73,020
Client Costs		0%		Excl.
Insurances		1.5%		$12,450
Statutory Fees and Charges		1.5%		$12,450
Design Contingency		10%		$82,980
Construction Contingency		10%		$82,980
Subtotal Indirect Costs				$263,880
Escalation		10.87%		$118,900
Total Project Cost				**$1,212,580**

Cost 2 - Build out the undercroft of the existing roof structure at TAFE Bowen (AU$)

Figure 79: Cost 2 - Build out the undercroft of the existing roof structure at TAFE Bowen (AU$)

Description	Qty	Unit	Rate	Total
Demolition / Site Preparation				
Carefully remove loose existing food processing equipment, work benches, storage cupboards, etc. relocate and store safely and re-install.	1	Item	$9,600.00	$9,600
Carefully remove fixed bollards and lighting located in under croft area.	1	Item	$2,400.00	$2,400
Carefully demolish and dispose of Cost 1 western side exterior wall.	1	Item	$4,800.00	$4,800
Carefully remove and salvage external double door.	1	Item	$2,400.00	$2,400
Carefully demolish and dispose undercroft ceiling metal sheeting.	1	Item	$4,800.00	$4,800

Description	Qty	Unit	Rate	Total
Assume maintain southern external metal sheeting.	Note			
Allowance for disposal	2	t	$500.00	$1,000
Site Excavation				
Site Excavation	1	Item	N/A	N/A
Substructure				
Substructure	1	Item	N/A	N/A
Columns				
Columns	1	Item	N/A	N/A
Upper Floors				
Upper Floors	1	Item	N/A	N/A
Stairs				
Stairs	1	Item	N/A	N/A
Roof				
Roof	1	Item	N/A	N/A
External Walls & Windows				
New exterior metal cladding to northern & western side of shed to match existing exterior cladding, assume northern side 5m high, western 6m average height.	118	m2	$140.00	$16,520
Secondary steel	118	m2	$120.00	$14,160
New insulated interior face of new (northern & western side) and existing exterior (southern side) wall, assume northern side 5m high, southern side 6m high, western 6m average height.	202	m2	$300.00	$60,600
Extra over for working around existing conditions	1	Item	$10,000.00	$10,000
External Doors				
Allowance to protect and tie in insulated double door between covered walkway and internal food processing area.	1	Item	$3,200.00	$3,200
Re-install insulated double doors into internal food processing area.	1	No	$3,200.00	$3,200
Internal Walls & Screens				
Assume no internal wall & screens	Note			
Insulated interior face of external walls included in external walls.	1	Item	Incl.	Incl.
Internal Doors				
Assume no internal doors	Note			
Wall Finishes				
Included in external walls	1	Item	Incl.	Incl.
Floor Finishes				
Allowance to existing concrete floor preparation i.e., levelling etc.	104	m2	$50.00	$5,200
Epoxy floor finish	104	m2	$160.00	$16,640
Floor coving	29	m	$90.00	$2,610

Description	Qty	Unit	Rate	Total
Allowance to make good and tie flooring and coving into Cost 1 internal area.	1	Item	$5,000.00	$5,000
Ceiling Finishes				
New insulated plasterboard ceiling	104	m2	$220.00	$22,880
Allowance to make good and tie ceiling into Cost 1 internal area	1	Item	$5,000.00	$5,000
Extra over for working around existing conditions	1	Item	$5,720.00	$5,720
Fitments and FF&E				
Food processing equipment including freezer, cool room, ambient store, IQF blast freeze, freeze dryer, packaging equipment, stainless bench x 2, wet processing area equipment, immersion COP tank.	1	Item	Excl.	Excl.
Reconfigure food processing equipment	1	Item	Excl.	Excl.
Hydraulic Services				
Assume existing water and wastewater supply sufficient. No allowance for upgrading included.	Note			
Allowance to reconfigure hydraulic services	1	Item	$10,000.00	$10,000
Mechanical Services				
Extra over for duct and diffusers to extended internal area	1	Item	$20,000.00	$20,000
Electrical Services				
Assume existing electrical supply sufficient. No allowance for upgrading included.	Note			
Allowance to re-configure electrical services including lighting, power outlets, switches.	1	Item	$10,000.00	$10,000
Fire Services				
Fire extinguishers and fire hydrant pump purchased as part of Stage 1.	1	Item	Excl.	Excl.
External Works				
Additional ambient store concrete pads	1	No	$4,500.00	$4,500
External Services				
External Services	1	Item	N/A	N/A
Total Direct Cost				$240,230
Contractors Preliminaries		20%		$48,050
Contractors Margin		10%		$28,830
Locality Factor		18%		$43,240
Total Construction Cost				$360,350
Design Consultant Fees		10%		$31,710
Client Costs		0%		Excl.
Insurances		1.5%		$5,410
Statutory Fees and Charges		1.5%		$5,410
Design Contingency		10%		$36,040
Construction Contingency		10%		$36,040

Description	Qty	Unit	Rate	Total
Subtotal Indirect Costs				$114,610
Escalation		18.77%		$89,140
Total Project Cost				**$564,100**

Cost 3 - New build 10m x 20m food grade building on a flat site (AU$)

Figure 80: Cost 3 - New build 10m x 20m food grade building on a flat site (AU$)

Description	Qty	Unit	Rate	Total
Demolition / Site Preparation				
Allowance for minor site grubbing and excavation (assume flat site).	1200	m2	$20.00	$24,000
Site Excavation				
Minor site excavation included above	1	Item	Incl.	Incl.
Substructure				
Strip footings (building perimeter & two middle)	100	m	$350.00	$35,000
Column bases	15	No	$1,200.00	$18,000
Concrete slab on ground	200	m2	$240.00	$48,000
Extra over allowance for concrete pony wall on building perimeter, 1m high.	60	m	$400.00	$24,000
Columns				
Columns (15 No) assumed 32kg/m2	2.88	t	$17,500.00	$50,400
Provisional allowance for cyclone grade construction (extent unknown - details to be defined).	1	Item	$40,000.00	$40,000
Upper Floors				
Upper Floors	1	Item	N/A	N/A
Stairs				
Stairs	1	Item	N/A	N/A
Roof				
Steel framing for roof structure including beams, rafters and bracing (assume 30kg/m2).	6.00	t	$17,500.00	$105,000
Lean-to (single pitched) metal deck roof including purlins	200	m2	$180.00	$36,000
Roof drainage	200	m2	$60.00	$12,000
External Walls				
Metal clad exterior walls assume 5m high lower side to 6m high upper side.	340	m2	$140.00	$47,600
Secondary steel	340	m2	$120.00	$40,800
Poly interior panel from top of concrete pony wall to ceiling, sealed into pony wall and ceiling.	280	m2	$300.00	$84,000
External Doors				
Insulated double external food grade doors	2	No	$15,000.00	$30,000

Description	Qty	Unit	Rate	Total
Large food grade external door to allow forklift access	2	No	$50,000.00	$100,000
Internal Walls & Screens				
Allowance to build out (walls, finishes, fixtures) of restroom and breakout kitchenette area.	1	Item	$80,000.00	$80,000
Internal Doors				
Included in internal walls & screens	1	Item	Incl.	Incl.
Wall Finishes				
Included in external walls	1	Item	Incl.	Incl.
Floor Finishes				
Allowance to existing concrete floor preparation i.e., levelling etc.	200	m2	$50.00	$10,000
Epoxy floor finish	200	m2	$160.00	$32,000
Floor coving, tied into concrete floor and concrete pony wall	60	m	$90.00	$5,400
Ceiling Finishes				
New insulated plasterboard ceiling	200	m2	$220.00	$44,000
Fitments and FF&E				
Food processing equipment including freezer, cool room, ambient store, processing room, IQF blast freeze, freeze dryer, packaging equipment, hopper packing machine stainless bench x 2, wet processing area equipment, immersion COP tank x2.	1	Item	Excl.	Excl.
Hydraulic Services				
Allowance for hydraulic services connection, supply, fixtures, sewer etc.	200	m2	$350.00	$70,000
Mechanical Services				
Allowance for mechanical / air-conditioning services to internal area including plant, equipment, ductwork, diffusers etc.	200	m2	$780.00	$156,000
Electrical Services				
Allowance for electrical services including electrical supply, electrical equipment, lighting, switches, switchboards, power outlets etc.	200	m2	$400.00	$80,000
Fire Services				
Allowance for fire services including fire sprinkler system, plant and equipment.	200	m2	$280.00	$56,000
External Works				
Additional ambient store, freezer x 2, and cool room concrete pads.	4	No	$4,500.00	$18,000
Allow for heavy concrete driveway (10m wide surrounding building).	1000	m2	$240.00	$240,000
Allowance for asphalt road access (allow 100m length x 6m wide) - assumes disposal of excavated material on site.	1	Item	$200,000.00	$200,000
Bollards	6	No	$1,200.00	$7,200
Line marking for car parking (8 No)	8	No	$250.00	$2,000
Allowance for landscaping	800	m2	$75.00	$60,000

Description	Qty	Unit	Rate	Total
Metal security fence (palisade type) surrounding facility - allow 10m past concrete driveway surround - 2.1m high.	180	m	$1,000.00	$180,000
Allowance for metal automatic gate and intercom system	1	No	$25,000.00	$25,000
External Services				
Allowance for onsite wastewater treatment facility and irrigation system.	1	Item	$75,000.00	$75,000
Allowance for stormwater drainage	40	m	$250.00	$10,000
Rainwater collection system including rainwater tanks (2 No 50,000L tanks), concrete slab, filters, connection into roof drainage and plumbing.	1	Item	$100,000.00	$100,000
50kw solar panel system installed on roof	1	Item	$30,000.00	$30,000
Allowance for exterior lighting & CCTV	1	Item	$50,000.00	$50,000
Allowance for electrical and potable water utility connection (within 2 kms from main connection) - assumes disposal of excavated material on site.	1	Item	$520,000.00	$520,000
Total Direct Cost				$2,745,400
Contractors Preliminaries		20%		$549,080
Contractors Margin		10%		$329,450
Locality Factor		18%		$494,170
Total Construction Cost				$4,118,100
Design Consultant Fees		10%		$362,390
Client Costs		0%		Excl.
Insurances		1.5%		$61,770
Statutory Fees and Charges		1.5%		$61,770
Design Contingency		10%		$411,810
Construction Contingency		10%		$411,810
Subtotal Indirect Costs				$1,309,550
Escalation		18.77%		$1,018,700
Total Project Cost				**$6,446,350**

Cost 4a - New build 10m x 31m food grade building on a flat site

Figure 81: Cost 4a - New build 10m x 31m food grade building on a flat site

Description	Qty	Unit	Rate	Total
Demolition / Site Preparation				
Allowance for minor site grubbing and excavation (assume flat site).	1530	m2	$20.00	$30,600
Site Excavation				
Minor site excavation included above	1	Item	Incl.	Incl.
Substructure				
Strip footings (building perimeter & two middle)	144	m	$350.00	$50,400

Description	Qty	Unit	Rate	Total
Column bases	22	No	$1,200.00	$26,400
Concrete slab on ground	310	m2	$240.00	$74,400
Extra over allowance for concrete pony wall on building perimeter, 1m high.	82	m	$400.00	$32,800
Columns				
Columns (22 No) assumed 32kg/m2	4.22	t	$17,500.00	$73,920
Provisional allowance for cyclone grade construction (extent unknown - details to be defined).	1	Item	$62,000.00	$62,000
Upper Floors				
Upper Floors	1	Item	N/A	N/A
Stairs				
Stairs	1	Item	N/A	N/A
Roof				
Steel framing for roof structure including beams, rafters and bracing (assume 30kg/m2).	9.30	t	$17,500.00	$162,750
Lean-to (single pitched) metal deck roof including purlins	310	m2	$180.00	$55,800
Roof drainage	310	m2	$60.00	$18,600
External Walls				
Metal clad exterior walls assume 5m high lower side to 6m high upper side.	461	m2	$140.00	$64,540
Secondary steel	461	m2	$120.00	$55,320
Poly interior panel from top of concrete pony wall to ceiling, sealed into pony wall and ceiling.	379	m2	$300.00	$113,700
External Doors				
Insulated double external food grade doors	2	No	$15,000.00	$30,000
Large food grade external door to allow forklift access	2	No	$50,000.00	$100,000
Internal Walls & Screens				
Allowance to build out (walls, finishes, fixtures) of restroom and breakout kitchenette area.	1	Item	$80,000.00	$80,000
Internal Doors				
Included in internal walls & screens	1	Item	Incl.	Incl.
Wall Finishes				
Included in external walls	1	Item	Incl.	Incl.
Floor Finishes				
Allowance to existing concrete floor preparation i.e., levelling etc.	310	m2	$50.00	$15,500
Epoxy floor finish	310	m2	$160.00	$49,600
Floor coving, tied into concrete floor and concrete pony wall	82	m	$90.00	$7,380
Ceiling Finishes				
New insulated plasterboard ceiling	310	m2	$220.00	$68,200
Fitments and FF&E				

Description	Qty	Unit	Rate	Total
Food processing equipment including freezer, cool room, ambient store, processing room, IQF blast freeze, freeze dryer, packaging equipment, hopper packing machine stainless bench x 2, wet processing area equipment, immersion COP tank x2.	1	Item	Excl.	Excl.
Hydraulic Services				
Allowance for hydraulic services connection, supply, fixtures, sewer etc.	310	m2	$350.00	$108,500
Mechanical Services				
Allowance for mechanical / air-conditioning services to internal area including plant, equipment, ductwork, diffusers etc.	310	m2	$780.00	$241,800
Electrical Services				
Allowance for electrical services including electrical supply, electrical equipment, lighting, switches, switchboards, power outlets etc.	310	m2	$400.00	$124,000
Fire Services				
Allowance for fire services including fire sprinkler system, plant and equipment.	310	m2	$280.00	$86,800
External Works				
Additional ambient store x 5, freezer x 2, and cool room x 2 concrete pads.	9	No	$4,500.00	$40,500
Allow for heavy concrete driveway (10m wide surrounding building).	1220	m2	$240.00	$292,800
Allowance for asphalt road access (allow 100m length x 6m wide) - assumes disposal of excavated material on site.	1	Item	$200,000.00	$200,000
Bollards	6	No	$1,200.00	$7,200
Line marking for car parking (12 No)	12	No	$250.00	$3,000
Allowance for landscaping	910	m2	$75.00	$68,250
Metal security fence (palisade type) surrounding facility - allow 10m past concrete driveway surround - 2.1m high.	202	m	$1,000.00	$202,000
Allowance for metal automatic gate and intercom system	1	No	$25,000.00	$25,000
External Services				
Allowance for onsite wastewater treatment facility and irrigation system	1	Item	$75,000.00	$75,000
Allowance for stormwater drainage	62	m	$250.00	$15,500
Rainwater collection system including rainwater tanks (2 No 50,000L tanks), concrete slab, filters, connection into roof drainage and plumbing.	1	Item	$100,000.00	$100,000
50kw solar panel system installed on roof	1	Item	$30,000.00	$30,000
Allowance for exterior lighting & CCTV	1	Item	$50,000.00	$50,000
Allowance for electrical and potable water utility connection (within 2 kms from main connection) - assumes disposal of excavated material on site.	1	Item	$520,000.00	$520,000
Total Direct Cost				$3,362,260
Contractors Preliminaries		20%		$672,450

Description	Qty	Unit	Rate	Total
Contractors Margin		10%		$403,470
Locality Factor		18%		$605,210
Total Construction Cost				$5,043,390
Design Consultant Fees		10%		$443,820
Client Costs		0%		Excl.
Insurances		1.5%		$75,650
Statutory Fees and Charges		1.5%		$75,650
Design Contingency		10%		$504,340
Construction Contingency		10%		$504,340
Subtotal Indirect Costs				$1,603,800
Escalation		27.23%		$1,809,890
Total Project Cost				**$8,457,080**

Cost 4b - New build 22m x 24m food grade building on a flat site

Figure 82: Cost 4b - New build 22m x 24m food grade building on a flat site

Description	Qty	Unit	Rate	Total
Demolition / Site Preparation				
Allowance for minor site grubbing and excavation (assume flat site).	1848	m2	$20.00	$36,960
Site Excavation				
Minor site excavation included above	1	Item	Incl.	Incl.
Substructure				
Strip footings (building perimeter & two middle)	140	m	$350.00	$49,000
Column bases	23	No	$1,200.00	$27,600
Concrete slab on ground	528	m2	$240.00	$126,720
Extra over allowance for concrete pony wall on building perimeter, 1m high	92	m	$400.00	$36,800
Columns				
Columns (23 No) assumed 32kg/m2	4.42	t	$17,500.00	$77,280
Provisional allowance for cyclone grade construction (extent unknown - details to be defined).	1	Item	$106,000.00	$106,000
Upper Floors				
Upper Floors	1	Item	N/A	N/A
Stairs				
Stairs	1	Item	N/A	N/A

Roof				
Steel framing for roof structure including beams, rafters and bracing (assume 30kg/m2).	15.84	t	$17,500.00	$277,200
Lean-to (single pitched) metal deck roof including purlins	528	m2	$180.00	$95,040
Roof drainage	528	m2	$60.00	$31,680
External Walls				
Metal clad exterior walls assume 5m high lower side to 6m high upper side.	530	m2	$140.00	$74,200
Secondary steel	530	m2	$120.00	$63,600
Poly interior panel from top of concrete pony wall to ceiling, sealed into pony wall and ceiling.	438	m2	$300.00	$131,400
External Doors				
Insulated double external food grade doors	2	No	$15,000.00	$30,000
Large food grade external door to allow forklift access	2	No	$50,000.00	$100,000
Internal Walls & Screens				
Allowance to build out (walls, finishes, fixtures) of restroom and breakout kitchenette area.	1	Item	$80,000.00	$80,000
Internal Doors				
Included in internal walls & screens	1	Item	Incl.	Incl.
Wall Finishes				
Included in external walls	1	Item	Incl.	Incl.
Floor Finishes				
Allowance to existing concrete floor preparation i.e., levelling etc.	528	m2	$50.00	$26,400
Epoxy floor finish	528	m2	$160.00	$84,480
Floor coving, tied into concrete floor and concrete pony wall	92	m	$90.00	$8,280
Ceiling Finishes				
New insulated plasterboard ceiling	528	m2	$220.00	$116,160
Fitments and FF&E				
Food processing equipment including freezer, cool room, ambient store, processing room, IQF blast freeze, freeze dryer, packaging equipment, hopper packing machine stainless bench x 2, wet processing area equipment, immersion COP tank x2.	1	Item	Excl.	Excl.
Hydraulic Services				
Allowance for hydraulic services connection, supply, fixtures, sewer etc.	528	m2	$300.00	$158,400
Mechanical Services				
Allowance for mechanical / air-conditioning services to internal area including plant, equipment, ductwork, diffusers etc.	528	m2	$750.00	$396,000

Electrical Services				
Allowance for electrical services including electrical supply, electrical equipment, lighting, switches, switchboards, power outlets etc.	528	m2	$370.00	$195,360
Fire Services				
Allowance for fire services including fire sprinkler system, plant and equipment.	528	m2	$250.00	$132,000
External Works				
Additional ambient store x 5, freezer x 2, and cool room x 2 concrete pads.	9	No	$4,500.00	$40,500
Allow for heavy concrete driveway (10m wide surrounding building).	1320	m2	$240.00	$316,800
Allowance for asphalt road access (allow 100m length x 6m wide) - assumes disposal of excavated material on site.	1	Item	$200,000.00	$200,000
Bollards	6	No	$1,200.00	$7,200
Line marking for car parking (14 No)	14	No	$250.00	$3,500
Allowance for landscaping	960	m2	$75.00	$72,000
Metal security fence (palisade type) surrounding facility - allow 10m past concrete driveway surround - 2.1m high.	212	m	$1,000.00	$212,000
Allowance for metal automatic gate and intercom system	1	No	$25,000.00	$25,000
External Services				
Allowance for on-site wastewater treatment facility and irrigation system.	1	Item	$75,000.00	$75,000
Allowance for stormwater drainage	48	m	$250.00	$12,000
Rainwater collection system including rainwater tanks (2 No 50,000L tanks), concrete slab, filters, connection into roof drainage and plumbing.	1	Item	$100,000.00	$100,000
50kw solar panel system installed on roof	1	Item	$30,000.00	$30,000
Allowance for exterior lighting & CCTV	1	Item	$50,000.00	$50,000
Allowance for electrical and potable water utility connection (within 2 kms from main connection) - assumes disposal of excavated material on site.	1	Item	$520,000.00	$520,000
Total Direct Cost				$4,124,560
Contractors Preliminaries		20%		$824,910
Contractors Margin		10%		$494,950
Locality Factor		18%		$742,420
Total Construction Cost				$6,186,840
Design Consultant Fees		10%		$544,440
Client Costs		0%		Excl.
Insurances		1.5%		$92,800

Statutory Fees and Charges		1.5%		$92,800
Design Contingency		10%		$618,680
Construction Contingency		10%		$618,680
Subtotal Indirect Costs				$1,967,400
Escalation		27.23%		$2,220,230
Total Project Cost				**$10,374,470**

Appendix 2 – References

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† Figure has been converted from its original current to Australian Dollars