2020

Bennett and Francis

Capability Statement

@bfsurveys
#BFcaptureTEAM

SURVEYING 100 YEARS

Survey | Planning | Construction Control | Leasing | Reality Capture | Scan-to-BIM

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Introduction

Our surveying and planning consultancy firm has been operating in Queensland since Cyril Fryar Bennett, Licensed Surveyor (1883-1962), began practicing in 1917, just over 100 years ago.

Mr Bennett was joined in partnership by Robin Francis in 1958.

Whilst we encourage traditional values and service, we are undoubtedly one of the State's leading Survey and Planning firms in the adoption and development of technology.

With Bennett and Francis, our customer receives the 'Best of Both Worlds', working with a traditional mindset, but receiving the benefits of cutting edge technology and work practices.

We have extensive experience with large corporate and government clients across our entire range of services

Left Image
Cyril Bennett's
Registration Certificate
1917

Right Image
Rob Francis's
His First Plan Lodged
1951

Cadastral and engineering surveys have been our mainstay products for over a century. But that doesn't mean we don't move with the times.

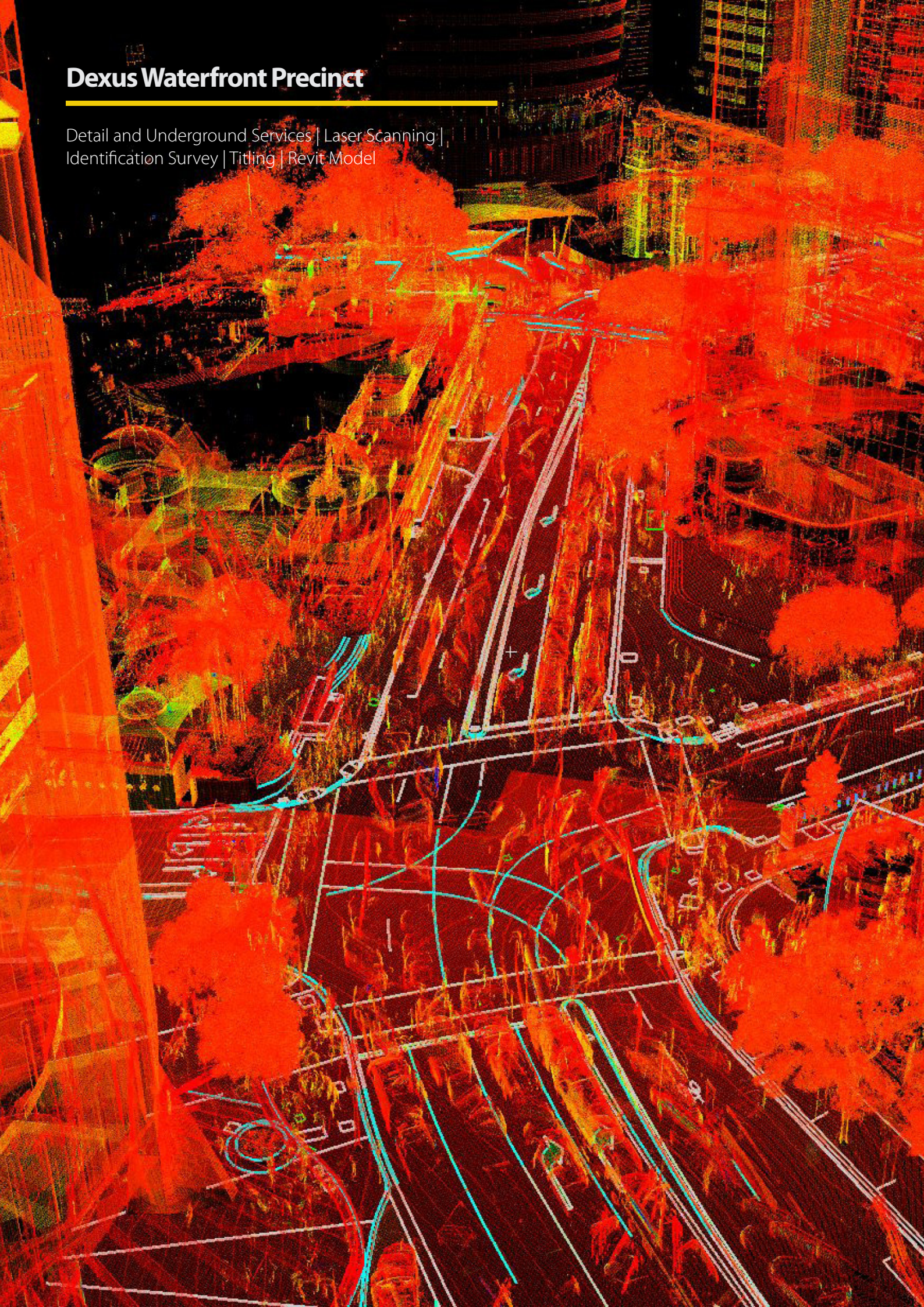
The technology of surveying has progressed rapidly in the last two decades with the development of key technology enablers like laser scanning, software-based photogrammetry (structure-from-motion reality meshes), drones/UAVs/RPAS (whatever you want to call them!), BIM/digital twins and common data environments.

We continue to invest heavily in equipment, software and workflows to take what surveying has learned over several millennia (starting with the Egyptians) and leverage the latest technology and techniques to capture and present data that is fit-for-purpose and within budget - we call it Reality Surveying - reality capture by a surveyor, so you know you can get data on datum, on grid, on budget.

We recognised long ago, a few lines on a sheet of paper or in PDF - what you might have traditionally called a survey - is not going to live up to expectations. And if you are still ordering "surveys" expecting flat, 2D output, we can only recommend you get in touch, get a demo and begin to understand what reality capture and scan-to-model/BIM can do for you at all stages of an asset life cycle - design, construct, and ultimately for facility management.

Dexus Waterfront Precinct

Detail and Underground Services | Laser Scanning | Identification Survey | Titling | Revit Model



Property Surveying

Our background in cadastral surveys including Identification Surveys, subdivisions, amalgamations, leases, volumetric and community titles schemes is renowned.

The majority of our surveyors hold Cadastral Endorsements issued by the Surveyors Board of Queensland to effect cadastral surveys and the firm is Accredited by the Department of Natural Resources and Mines to examine and approve cadastral survey plans.

We are specialists in preparing titling plans including building format and volumetric plans that are often combined to form complex multi layered community titles schemes.

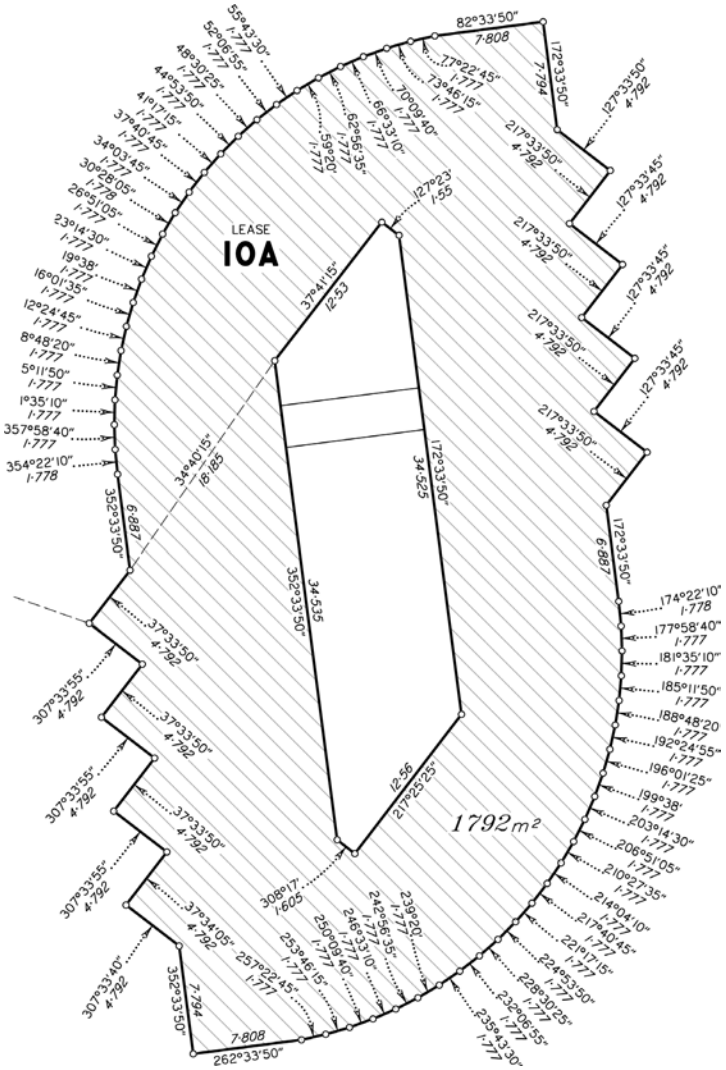


Image
Waterfront Place Commercial Lease Plan

Cadastral Surveying

Identification Surveys
Boundary Surveys - Marking and Pegging
Due Diligence Reports
Subdivisions and Amalgamations
Building Format Plans
Complex Community Titles Schemes
Preparation of Easements
Retail and Commerical Leases
Lease Master Plans
Leases of Land
Lot Calculations
Volumetric Surveys (various types above)
Ambulatory Boundaries
Staging Advice for Tenure
Expert Witness Appearances

192 Ann Street Roof Garden

Laser Scanning | Engineering Survey for bridge

Laser Scanning

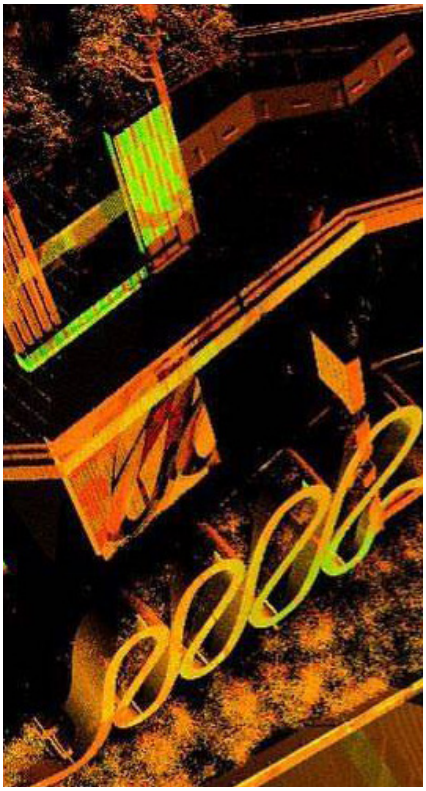


Image
Looking down through the laser scan / point cloud survey of the Law Courts Precinct, Brisbane

Laser scanning produces a 3D survey and could be considered to cover a subset of technology in the overall reality capture field. Laser scanners operate on the simple concept a spinning sensor that "fires" a laser. The laser pulses hit surfaces in range - the reflected laser returns are registered by a sensor back in the scanner. The angle of the laser and the distance to the surface it hits is recorded - resulting in a point in 3D space.

As with all technology, improvements are made with time - and today's scanners can measure in multiple millions of points per second - a point cloud.

All of our scanners also include the ability to capture spherical imagery at each station, further enhancing the point cloud with colour and improving overall documentation.

Just some potential uses for laser scanning data ...

Scan-to-BIM / Scan-to-Model
Hazardous sites surveys (we can survey remotely) - eg a rail corridor
Detail and Level Surveys - with CAD extract done in the office
Heritage Building Surveys
Plant
Facade Surveys - perhaps for combustible cladding analysis
Floor Flatness Surveys
Dilapidation Surveys
Deformation and Monitoring Surveys

Reality Surveying and Feature Extraction

When CAD became established, everyone shared their data on an agreed coordinate system.

As surveyors, we had control points in the field which were marked with screws and the like. We had known and published coordinates for these control points, so other surveyors, builders, and other spatial professionals could align themselves in the field and virtually (ie their own CAD) with everything produced before it.

There is no reason to stop this practice with technologies like laser scanning or UAV surveys. We hear it all to often, how consultants are "nudging" point clouds in to place. It isn't supposed to be like that.

If the point clouds and reality meshes you are receiving, don't line up with your other CAD and BIM data out of the box - and "origin-to-origin", there is another way - ***Reality Surveying***, not reality fudging.

Reality capture uses technologies like laser scanning and photogrammetry to capture immense amounts of data about a scene.

This allows us to produce CAD, models, meshes and all manner of downstream deliverables.

Image
Blended image of a laser scan/point cloud survey (from left), transitioning to Revit model on right.

Reality Surveying Services

Scan-to-Revit Models (or IFC)
CAD Detail and Level Surveys
Contour Surveys
Orthographic - Plan View
Othographic - Elevations
Facade Surveys
Dilapidation Surveys
Spherical video, including 3D
Google Street View accredited
BIM data for facilities management

Image
3D spherical still and video camera for dilapidation reports, Google Street View updates, site tours, construction documentation

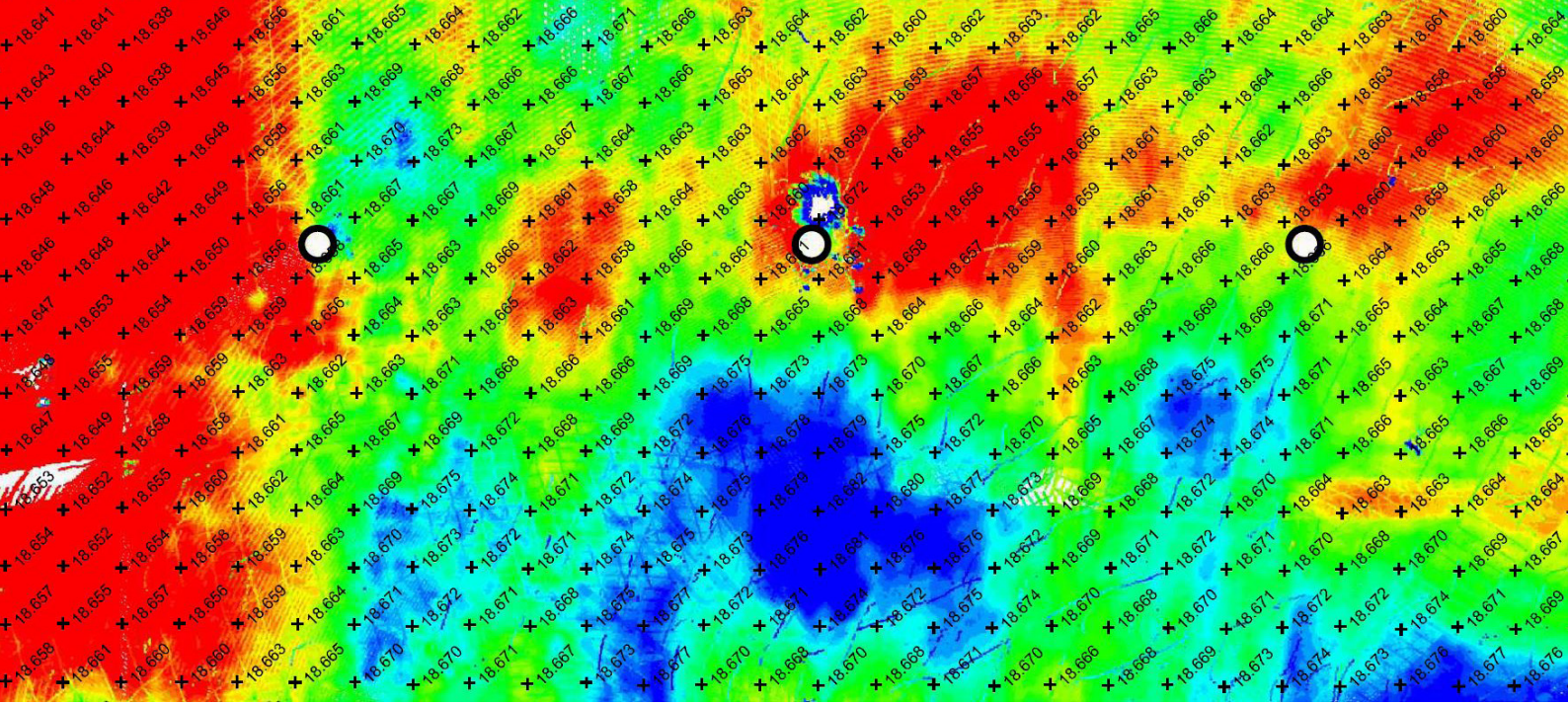


Image
Typical floor flatness output from laser scan including grid of levels and a "heat map" showing deviation from design, coloured by elevation range in millimetres.

Construction Surveying

Construction Services

Pre-construction dilapidation record
Control + grid placement
Construction set-out
Floor flatness analysis
As-constructed data collection
Model as-constructed validation
Point cloud-to-model clash detection
Monitoring/movement analysis
Underground services locating

Our construction teams operate in close cooperation with project Engineers and Architects, armed with high precision robotic total stations, to lay out marks and information for construction purposes on the ground.

We service all stages of the project, from initial design data both above and below ground, dilapidation reporting, actual construction set out and preparation of as-constructed data.

Additional services include project documentatation capture via laser scanning and even as-constructed vs model validation, again from laser scan.

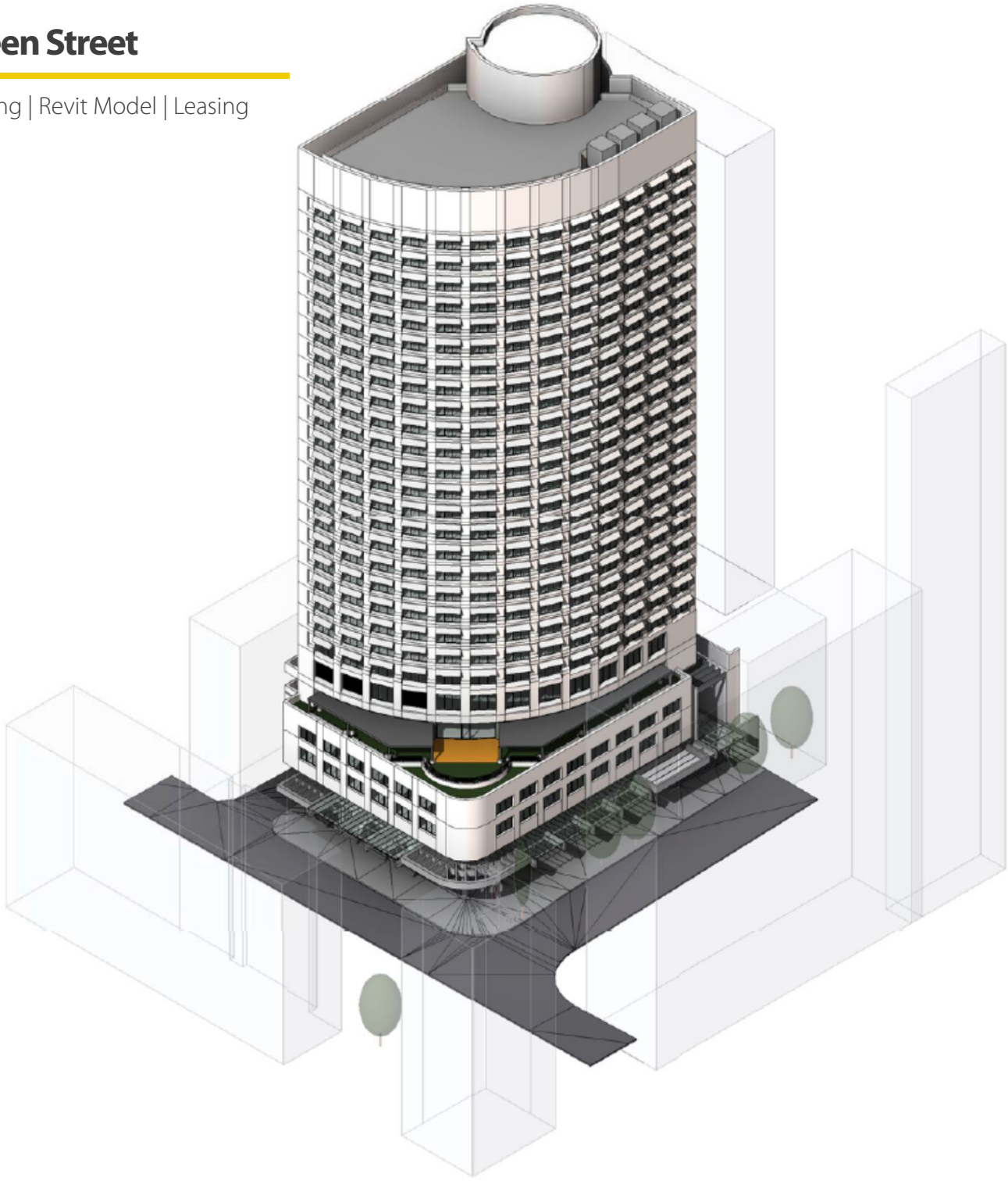
Our past projects include large scale earthworks, road and sewer networks, high rise buildings, high precision engineered custom projects (eg dam walls and gates), international level sports facilities (eg tennis courts, pools, rowing courses etc) and many other varied and exacting installations.

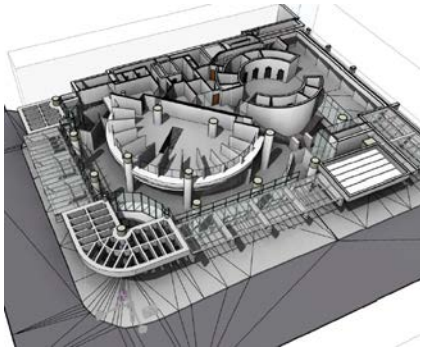
Queensland Children's Hospital

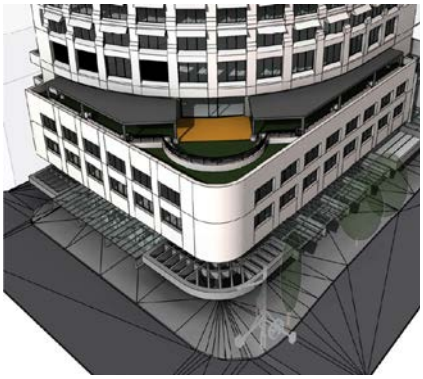
Detail and Underground Services
Construction Control and As-constructed
Cadastral Consultancy | Dilapidation Report

240 Queen Street

Laser Scanning | Revit Model | Leasing







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Survey | Planning | Construction Control | Leasing | Reality Capture | Scan-to-BIM

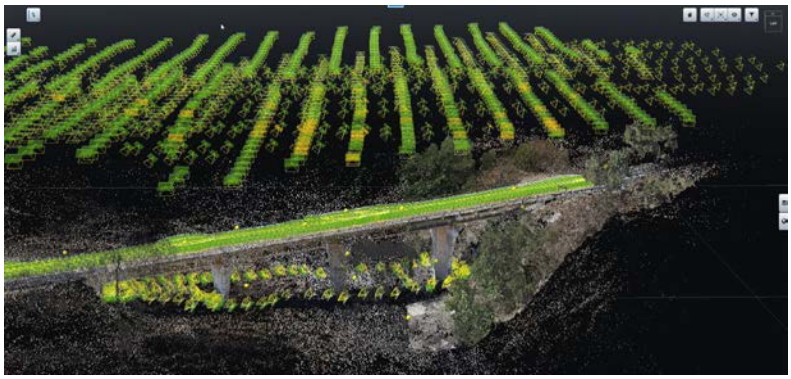
Drone Surveys and Reality Meshes

UAV-mounted and hand-held cameras are used to collect overlapping photography of a site.

Combined with ground control and serious computing resources, the photographs are "stitched" into a 3D reality mesh.

The processes involved are Automatic Aerial Triangulation (AAT) and Bundle Block Adjustment (BBA) – these steps calculate the exact position and orientation of the camera for each photograph in the set.

From this point, matching pixels in the photographs essentially become points in the model. These points can then be "joined" to become a reality mesh.



Drone Services

CASA qualified pilots
Nadir and Oblique Photogrammetry
Aerial Inspections
Reality mesh production
True orthographic imagery
Construction monitoring
Stockpile volume calculations

Image
Aerial inpsection of a telecom tower - also flown to create a reality mesh

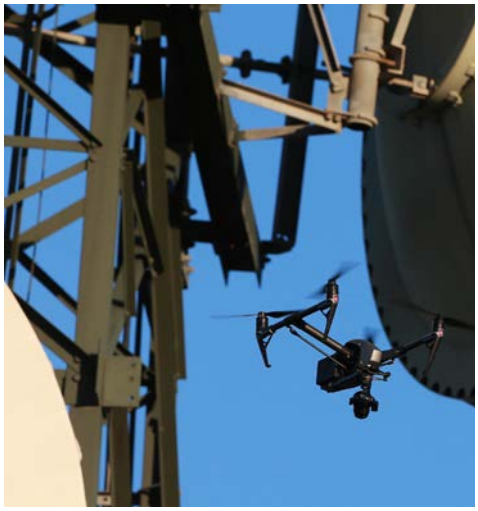
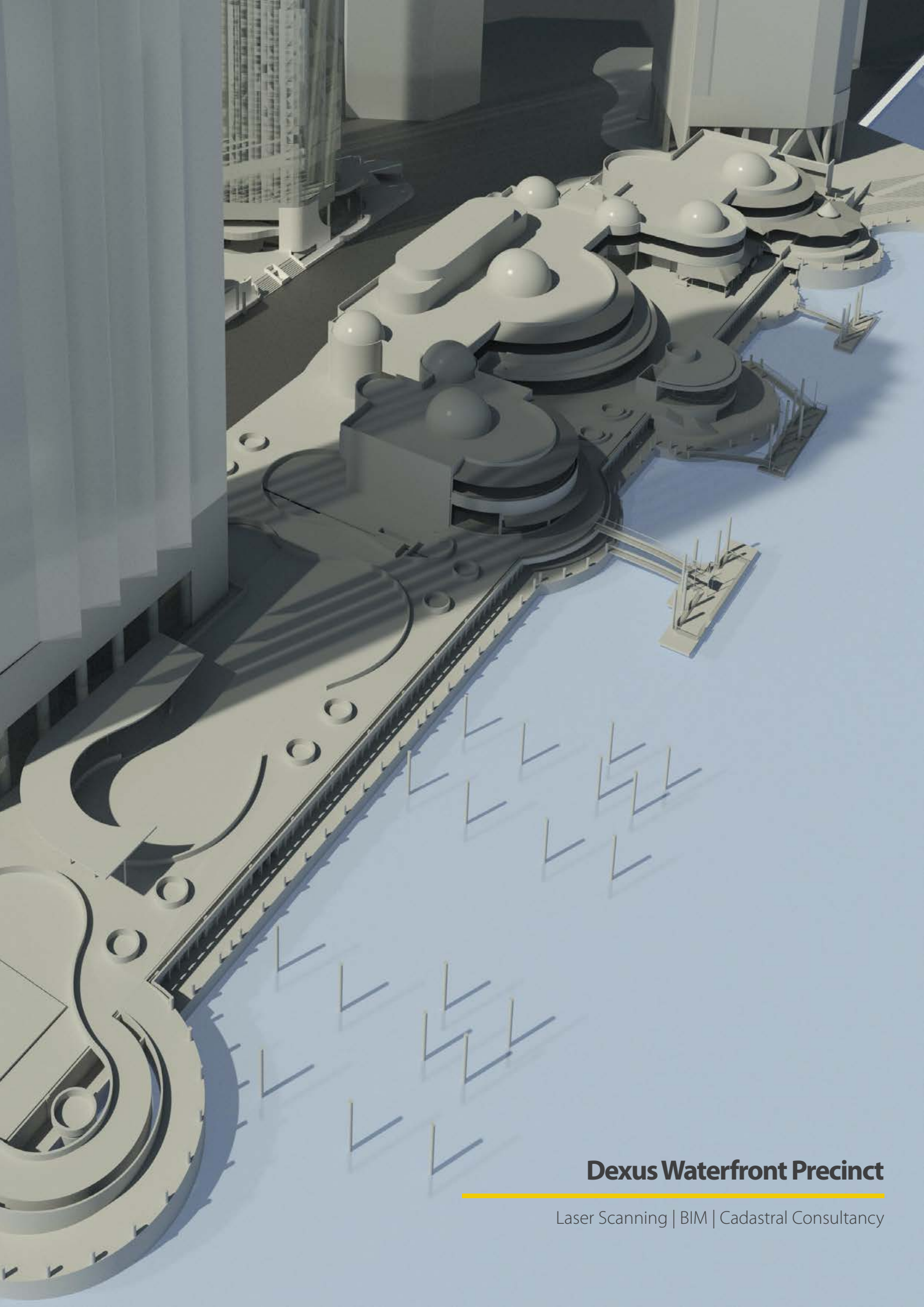


Image above - preparation of the reality model in Context Capture - thousands of images, survey control and laser scan together.
Image below - Survey-grade reality mesh as a result from above model post-processing.



Dexus Waterfront Precinct

Laser Scanning | BIM | Cadastral Consultancy

Town Planning

Bennett & Francis has for some considerable time had an interest and capability in town planning.

We have acted successfully as planners in many large scale projects and countless projects of a smaller scale.

Our current planning department is led by Phillip Pozzi (a partner in the business) who has managed briefs comprising town planning advice, material changes in use (rezoning), reconfigurations, planning reports and objections.

The town planning capability is often integrated with the cadastral / titling components of projects to offer a seamless project from inception to completion.

The town planning capability is also often integrated with the cadastral / titling component in Due Diligence associated with the sale or purchase of real estate assets.

Planning Services

Development Applications Local Authorities
- Reconfiguration of a Lot
- Material Change of Use
- Prescribed Tidal Work
- Building Work

Brisbane City Council RiskSMART Accredited
- Reconfiguration of a Lot (10 lots or less)
- New Dwelling House
- Extension to Existing Dwelling House
- Educational Establishment (School)

Brisbane City Council SealSMART Accredited

Development Change Applications
Development Potential Assessment
Ministerial Infrastructure Designations
Heritage Exemption Certificates (Local and State)
Planning and Environment Court Appeals
Due Diligence

Anglican Church Grammar School

Successful Ministerial Infrastructure Designation (MID)

Computing and Information Technology

The last few years has seen the more progressive consultancies embrace the 3D Immersive World and Bennett and Francis is prominent in this arena.

Technologies such as laser scanners; UAV (drones); robotics, machine learning and complex software suites are now common place with multiple tools deployed on a single project.

Technology such as laser scanners; drones; machine learning are all disruptive in their own and create significant amounts of data.

In order to effectively manage these large files we have our own GPU-enabled, hyper-converged cluster – our private cloud.

Our cluster delivers on our vision of the future, whether half the cluster is processing very high resolution UAV photogrammetric surveys into accurate meshes, or one of the GPU's is dedicated to a Leica Jetstream server where we can stream point clouds straight into a plug-in in a client's Revit session; or where the cluster is analysing detailed laser scans for automated model validation these things require grunt and specialist operators and we are investing in this technology.

IT Capabilities

Hyper-converged Cluster
Point cloud / laser scan hosting
Reality mesh production
Photogrammetry processing
Geographical Information Systems
In-house programming and scripting
Client Access Portal
High speed fibre-based Internet
Full remote-work capabailities
High-speed cloud-backed client data downloads

Image
Reality Mesh of Hayman Island after Cyclone Debbie.

This mesh was created from over 7,500 images.

The accuracy of the mesh is better than 50mm and the image/ texture resolution is ~ 10mm.

2020

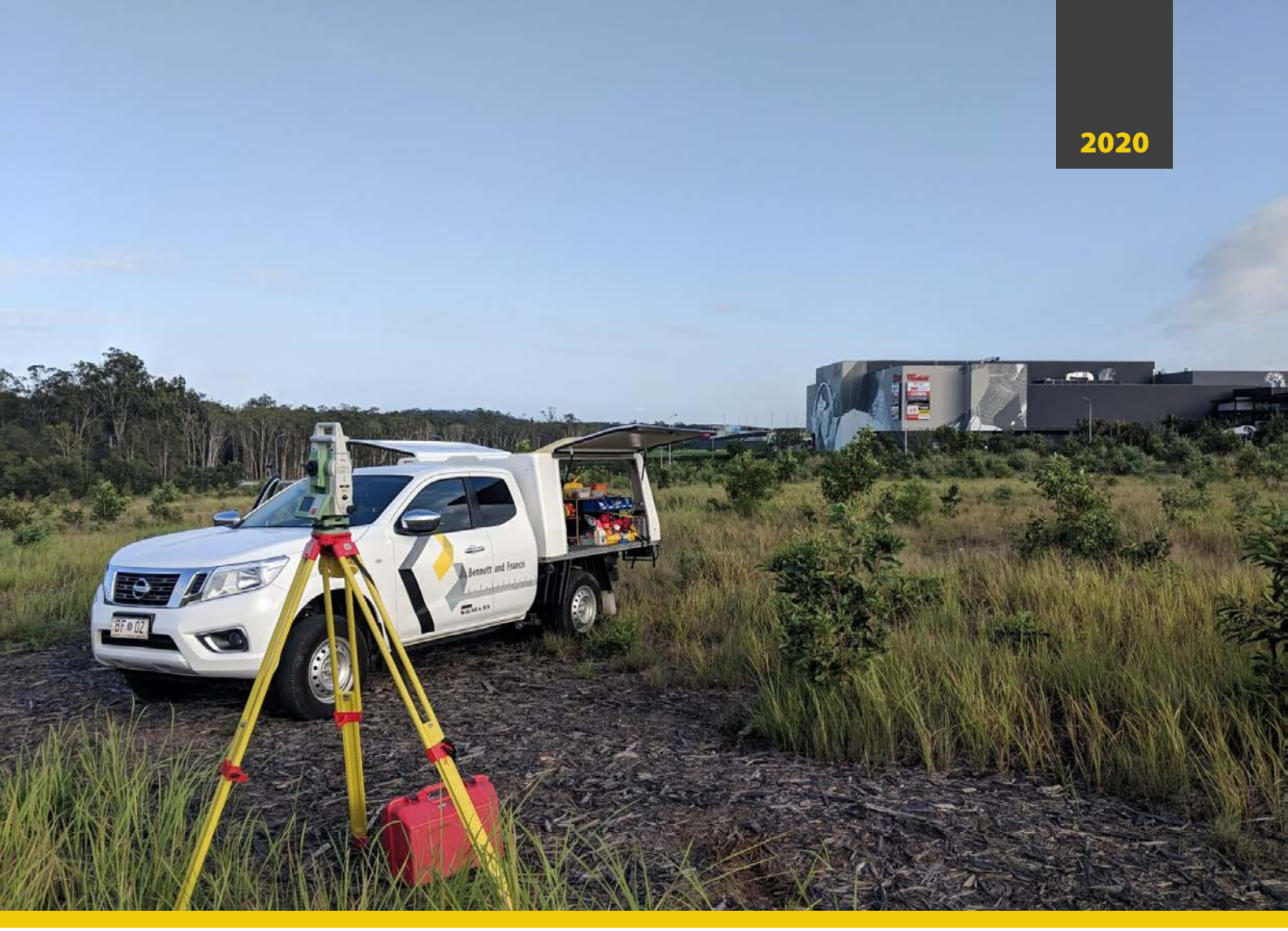


Image - Westfield Coomera
Detail and levels for design | Construction Control | Town Planning and Cadastral Consultancy

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Survey Planning Construction Control Leasing Reality Capture Scan-to-BIM