

# Re-Development of the WIN Stadium Western Grandstand, Wollongong

**Stephen Saunders**

NSW Public Works

[stephen.saunders@services.nsw.gov.au](mailto:stephen.saunders@services.nsw.gov.au)

**Jarad Cannings**

NSW Public Works

[jarad.cannings@services.nsw.gov.au](mailto:jarad.cannings@services.nsw.gov.au)

## ABSTRACT

*The WIN Stadium and WIN Entertainment Centre precinct in Wollongong occupies Crown Land and is administered by the Illawarra Venues Authority, a state government authority under the portfolio of Education and Communities NSW. This project commenced in late 2009, with NSW Public Works, Project Management Group, being engaged by the Illawarra Venues Authority to manage the overall western grandstand re-development project after a significant grant was secured from the state government. This project valued at \$29 million involved the complete demolition of the existing inadequate and dilapidated 1960s grandstand and replacing it with a new stand with over 6,000 seating capacity. NSW Public Works Project Management Group then engaged Surveying and Spatial Information Services to undertake an assortment of different surveys to assist with architectural and engineering design and land matters issues. This paper sets out to describe some of the various surveys undertaken by our local survey team to achieve the project objectives. The surveys included establishment of a control survey, initial detail surveys and utility service locations, creation of an accurate cadastral model, detail survey extension to include more areas of the stadium undergoing upgrades, a terrestrial laser scan survey of the whole stadium, setout and location off geotech boreholes, conformance checks and volumes, construction setout, land matters surveys including title consolidation, electrical padmount substation and underground cable easements, stratum subdivision for lease purposes, and road closure for lease purposes. Not all of these types of surveys are discussed in this paper, however some of the more interesting components are examined. The roof of the new stadium was completed in early August 2011 with much excitement generated in the local media regarding the recommencement of St George-Illawarra Dragons games at WIN Stadium. However, on 20 September 2011 a strong wind event caused the failure of two roofing bolts, resulting in major damage to the roof structure and sheeting. This paper provides some insight into how and why this may have happened, but the paper mainly describes the surveys and processes undertaken by NSW Public Works, Surveying and Spatial Information Services.*

**KEYWORDS:** *Detail, land matters, re-development, roof, easements, Illawarra Venues Authority.*

## 1 INTRODUCTION

WIN Stadium is located in Wollongong, NSW and is the premier sporting facility within the Illawarra region. The stadium is one of two home grounds used by the St George-Illawarra Dragons National Rugby League football club, and is currently operated by the Illawarra

Venues Authority (IVA). The IVA is an authority within the Office of Communities, under the Department of Education and Communities, within the portfolio of the Minister for Citizenship and Communities.

NSW Public Works were appointed project managers for the construction of the new western grandstand in early 2010. NSW Public Works, Surveying and Spatial Information Services (SASIS), have been involved with the WIN Stadium western grandstand re-development project since its inception. SASIS have undertaken numerous field surveys, prepared a variety of survey plans, and facilitated the land matters associated with the project.

### **1.1 History of the Venue**

Rugby league football games began being played at the original Wollongong Showground in 1911. Up until that time the venue hosted mainly agricultural shows and greyhound racing. The Illawarra Steelers entered the NSW Rugby League competition in 1982, and a few years later the ground was converted into a more football-friendly rectangular shape. The facility was situated on Crown Land, and in 1986 the Wollongong Sportsground Act appointed the Sportsground Trust to administer and manage the venue.

The southern grandstand was built in 1992, with the WIN Corporation purchasing the naming rights in 1997 when the venue became WIN Stadium. In 1998, on the same Wollongong Sportsground land, and abutting WIN Stadium, the Wollongong Entertainment Centre was opened. In 2002 the new northern grandstand was opened, further increasing the stadium's seating capacity.

The Illawarra Venues Authority replaced the Sportsground Trust as the government-appointed management authority for the now WIN Sports and Entertainment Centre, Wollongong. In October 2009, the government announced nearly \$29 million in funding for the construction of the new 6,170 seat capacity western grandstand, taking WIN Stadium's capacity to over 23,000 people.

Recently, the government announced that sporting venue authorities including the Illawarra Venues Authority, Hunter Region Sports Venues Authority, and the Parramatta Stadium Trust were to be abolished and replaced with a broader authority called Venues NSW.

### **1.2 Project Overview**

The \$28.9 million project involves:

- Demolition of the existing "Sid Hayes" western grandstand and other buildings including an electrical substation, old turnstiles, media broadcast boxes, workshops and physio rooms.
- Preparation of the site including new drainage works and major electrical works.
- Construction of a new 6,170 seat capacity covered grandstand and associated works including new ticketing and turnstile facilities, corporate facilities, improved player facilities, and upgrades to pedestrian and traffic movement areas outside the ground.

The main new grandstand (Figure 1) is designed to fit between the two existing lighting towers located on the western side of the ground. The grandstand's top levels of seating extend out over Harbour Street, with its supporting concrete pillars located within the current bitumen road formation.



Figure 1: Artist's impression of the new WIN Stadium western grandstand.

## 2 SURVEY COMPONENTS

### 2.1 Initial Control Establishment and Site Detail Survey

A well conditioned survey control network, external to the main demolition site, was established using total station traversing methods, utilising existing SCIMS permanent marks (LPI, 2012) located adjacent to the site. The control survey was carried out on an MGA94 (ICSM, 2006) origin and azimuth, based on a plane “flat earth” grid, and referred to the AHD71 height datum (Roelse et al., 1971).

A detail survey of the site ensued, locating all features relevant to the design and construction, including buildings, sheds, stairs, light towers, surface types, kerbs, fencing, spot levels, and utility services where possible. Heights of the light towers and the existing grandstand roof were determined for design, and the detail survey also included accurate location of the property boundary and any reference marks. Most of the detail survey was undertaken using a total station, with some fill-in by RTK GNSS methods.

The initial detail survey only included the western grandstand and its immediate surrounds. However, as the project developed, more and more of the stadium was required to be surveyed in detail. This resulted in extending the site further to the south which was to be used for new car parking facilities, and also further to the north where new turnstiles, gates and a substation were to be located. Some services location was carried out by SASIS, however the Dial Before You Dig (DBYD) search revealed a number of Sydney Water sewer and water mains, and high-pressure gas mains which needed to be defined, so a professional service locator was engaged to locate these. Of particular interest was the location of a large Sydney Water outfall main (750 mm diameter) which ran along Harbour Street. Location of these mains was critical because the footings of the supporting pillars of the grandstand were going to be located within the road formation, very close to the existing services.

Once the detail survey was plotted, a cadastral anomaly was discovered with the existing old electrical substation. The existing substation at the time consisted of a brick building approximately 8 by 6 metres in size, butting up against the Harbour Street boundary.

However, the small Crown portion that showed up on the LPI Cadastral Records Enquiry (CRE) search, and owned by the then Integral Energy, was located approximately 8 metres further south than it should have been. All that existed on the small portion was a concrete driveway.

## **2.2 Engineering Surveys during Demolition and Construction**

As more utility services were discovered during the investigation and demolition phases, further detail survey works were undertaken to locate these and add them to the existing detail survey plan. Borehole locations were accurately marked out on the road pavement, so that geotechnical drilling could proceed safely without striking the abovementioned Sydney Water mains in Harbour Street.

A baseline survey for the earthworks was also undertaken, involving a survey along the construction gridlines which provided vertical profiles of the site in relation to the existing kerb levels. This small and seemingly insignificant exercise proved to be of great value when the first variation claim for additional earthworks from the contractor was received. NSW Public Works were able to prove from the baseline survey that the contractor's claim was invalid; therefore the variation was subsequently rejected, saving the client valuable money.

## **2.3 Terrestrial Laser Scan (TLS) Survey**

Being a high-profile project amongst the local Illawarra community, and also being a piece of infrastructure that was going to be visually obvious, the new grandstand was always going to attract a lot of attention from the public and from local residents and businesses alike. One concern was that the occupants of the recently completed hotel and residential apartment blocks across the road in Harbour Street may object to the development if their views of the beach and ocean became obstructed by the new grandstand roof.

In order to address this potential risk to the project, it was proposed that a Terrestrial Laser Scan (TLS) survey be undertaken of the stadium and its immediate surrounds. NSW Public Works engaged the AAM Group, based in Wollongong, directly to undertake the TLS field survey, to register the data, and to produce a point cloud. By doing this survey, a spatial relationship could be established between the existing grandstand and any of the surrounding buildings. The TLS survey would produce a point cloud that is spatially referenced in MGA94 and AHD71 and could be used to augment the existing detail survey information. By merging the architectural design into the TLS point cloud, a digital product can be created that has much broader value-added applications than the engineering detail survey (Figure 2).

The TLS information combined with the 3-dimensional architectural model could be used for a variety of applications including:

- Assessment of sight lines from any viewpoint.
- Creation of shadow diagrams.
- Interference assessments between the new build and the existing light towers.
- Confirmation of the exact height and characteristics of the light towers.
- Development of public relations material, artist's impressions, etc.
- Assessment of the Development Application by Wollongong Council and the Joint Regional Planning Committee.

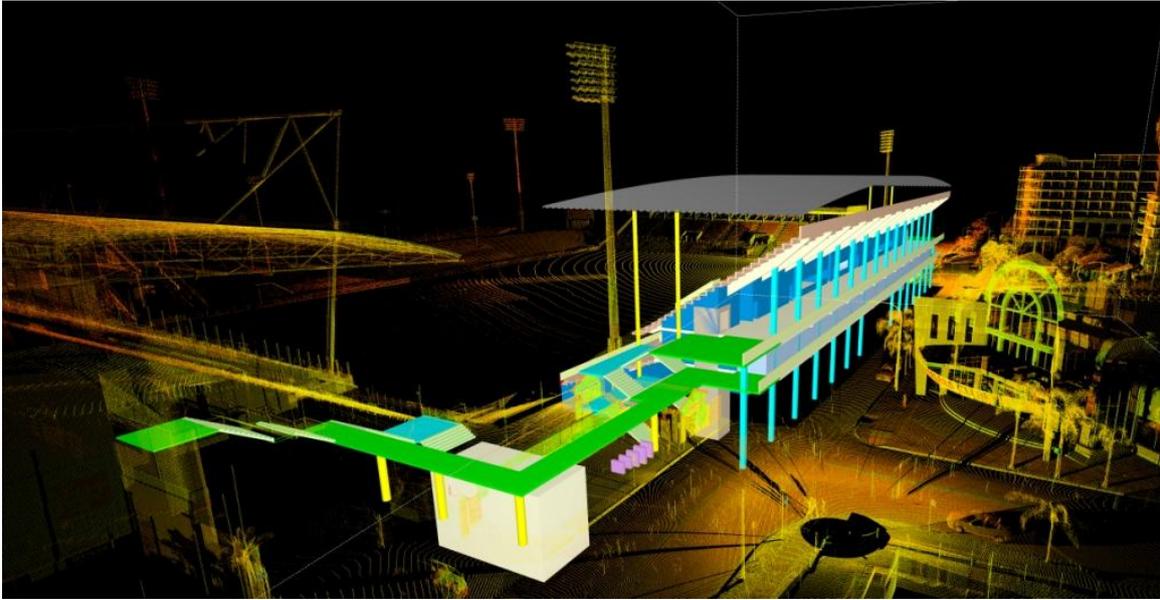


Figure 2: Architectural 3D model merged into TLS point cloud.

## 2.4 Cadastral Elements

### 2.4.1 Existing Electrical Substation

During the planning phase of the project, it became apparent that an existing electrical substation located on Harbour Street was not positioned within the original Crown portion that was created to accommodate the structure. The substation, owned and maintained by Endeavour Energy (formerly Integral Energy), was a 1960s brick building of 6 by 8 metres in size, incorrectly standing approximately 8 metres further north than the Crown portion.

As part of the new western grandstand design, it was proposed to demolish the existing substation and construct two new replacement padmount substations approximately 30 metres to the north of the present substation. Easements for the two new substations and underground cables were created by the lodgement of a Deposited Plan, accompanied by the supporting Section 88B instrument.

As the Crown portion was not serving any purpose, the decision was made to consolidate the portion with the existing lot which the stadium occupies, owned by IVA. The first step in the consolidation process was for IVA to purchase the Crown portion and consequently gain the Certificate of Title. After negotiations with Endeavour Energy, it was agreed upon to transfer the Certificate of Title to IVA for a token amount of \$1. At this point in time the consolidation process has not progressed any further with the survey plan currently being in its draft stage.

### 2.4.2 Harbour Street Partial Road Closure

During the planning phase, it was outlined that the newly constructed western grandstand was to overhang the public road, Harbour Street, up to approximately 8 metres at roof level. Not only was the structure to overhang the road, it was also to be supported by 14 concrete columns. These columns were to be positioned 7.2 metres west of the stadium subject lot, therefore occupying the road at surface level.

The nature of this design created numerous land issues, firstly in regards to the land zoning. Harbour Street and land to the west was zoned as B4 (mixed-use) which prohibits major recreation facilities. Therefore, in order for the development application to be approved, the small strip of affected road had to be rezoned to SP3 (tourist zone) to coincide with the zoning that applies to WIN Stadium.

Another issue was to deal with the overhanging grandstand and columns encroaching onto public road (Figure 3). Following liaison between council representatives and Land and Property Information (LPI), it was decided to close the affected portion of the road. The part to be closed comprised of the surface area and stratum airspace occupied by the 14 columns and overhanging structure. The closed road portions were to be sold to Wollongong City Council and consequently leased to Illawarra Venues Authority for the annual rent of \$1.

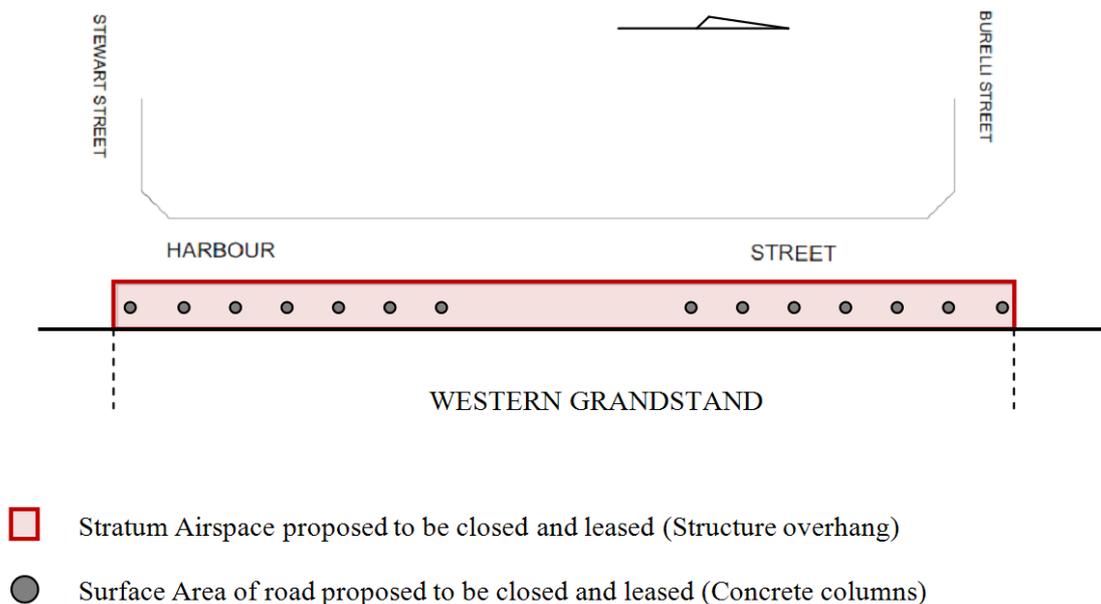


Figure 3: Property matter proposal within Harbour Street.

NSW Public Works survey services were called upon to carry out the survey plan to enable the abovementioned road closure. Due to the unusual nature of survey, discussions were held with LPI in regards to how the columns and stratum airspace were to be shown. It was settled upon to show the columns as part lots (being Lot 1) with surveyed connections shown in between each column. The limit in depth of Lot 1 was defined as two regular inclined planes, being the road surface of Harbour Street, shown by reduced levels related to AHD71 on the surface of the plan. Each column was given a part area with the total area of Lot 1 summing to 3.5 m<sup>2</sup>. The limit in height of Lot 1 was defined as the horizontal plane at RL 9.82 m coinciding with the underside of the overhanging grandstand. Lot 2, being the stratum airspace of which the overhanging grandstand was occupying, was limited in depth by RL 9.82 m, abutting with the height limit of Lot 1 (columns). No height limit was placed upon Lot 2.

The survey plan has not been lodged due to the roof buckling under strong winds in September 2011. The entire recently constructed roof was disassembled in order for repairs to be undertaken. It is now expected that the stadium will be ready for use by June 2012.

### 3 CONCLUDING REMARKS

This paper has summarised NSW Public Works, Surveying and Spatial Information Services, involvement in the construction of the new western grandstand at WIN Stadium in Wollongong. During the planning phase of the project several control and detail surveys were carried out, providing the important framework for the design team. As the project matured, survey services were called upon for utility service location, borehole set-out and earthwork surveys. NSW Public Works had its first experience with Terrestrial Laser Scanning, and has since been able to deploy TLS for other projects which may be discussed in future papers. Several cadastral matters were encountered and successfully dealt with by effective communication between SASIS staff and other involved parties such as NSW Public Works project managers, council and utility authorities.

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