Campus and Effect
or Ways of Designing Incompletely

A project submitted in fulfilment of the requirements for the degree of Master of Architecture.

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Declaration
I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since July 2003; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

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Michael Bouteloup
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Preface:
The work in this document is a product of part-time individual design research commenced in 2005 in campus projects.

The general theme of the research questions how to address indeterminacies, identity and coherence in campus projects which are delimited by briefing and existing frameworks. The research proposes using autonomous rules or ‘tacit urban principles’ that may be latent on the site to generate an architectural order.

The research projects are also pursued and conducted within a general framing discussion - included in this document - on the history of the campus with examples from local and international architects. This is not intended as an exhaustive historical survey, but is an examination of those precedents of interest and relevance to the parameters of this project.

The research is undertaken with a background of work completed in architectural practice in campus projects. This practice work provides an insight into emerging campus types and tendencies and generated the premise and the issues for the research enquiry. The practice design tendencies of accretion, program density, open space, syntax, and infrastructure are a subset to the main themes of the research.

In order to explore and develop the ideas of the thesis three projects of an addition/intervention type are proposed on campuses of varying scales and program, each with the specific constraints of a contemporary site and brief. The first project is at Melbourne Grammar School, a secondary school campus with a significant architectural history; the second is at Chisholm Institute of TAFE, Berwick, an exurban TAFE training campus with limited site history; the third project is at the University of Western Sydney, Parramatta, a university campus with a history of appropriation by different institutional types.
Part 1 - Introduction

In this research, the campus is considered as a distinctive urban condition with frequently varying parameters which allow fleeting and often incomplete architectural outcomes. This design research looks at ways of engaging with and acknowledging the incomplete and the indeterminate within the established constraints of existing campuses and the common methods of architectural procurement.

Contextual tactics treat constraints as opportunity and move away from a modernist ethic – and aesthetics – of transgression. Working with and not against the site, something new is produced by registering the complexity of the given.¹

Similarly, this research seeks to reconceive the campus as an enduring and evolving architectural idea on sites imbued with inherent constraints. The projects also look for ways of operating in the campus cognisant of the temporal nature and architectural flux of these sites and institutions.

Premise

The project has evolved from a disposition which has developed from an understanding of some of the modes of the campus, its procurement and various physical manifestations. These observations and assertions - originating in the author’s experience and architectural practice work on campuses - form the departure point for the study.

The premise accepts three interrelated points: that master planning is a limited tool for architecture in the campus; that the campus continues to exist as a defined typology of urban accretion; and that rule formation and ‘ideal making’ are integral to the campus type.
Demise of the master plan - *Strategy is dead. Long live strategy*²

In my view, the campus master plan (or as Sorkin ironically prefers, “the all-at-once-plan”) is increasingly ineffectual as a contemporary architectural tool of the campus. Reduced to a fiscal document, data projection and the tendencies of competing transitory interests, the master plan is too frequently redundant or outdated shortly after inception. The master plan is finite and projects a pre-determined outcome, it generalises, totalises, and homogenises by opposing the inevitable indeterminacy of contemporary and complex institutional programs.

A development framework or structured relationship between buildings and spaces remains a desirable means for planning the future order and growth of a campus. However, the contemporary master plan is increasingly diminished in its capacity to remain valid as the variables are rapidly re-conceived in time frames which are too short for large construction phases. An early example is Monash University’s Clayton campus - Australia’s first ‘planned’ university – where haste, rapid expansion and revision resulted in ‘pressure to forfeit a very necessary complexity and expression in Monash’s architectural program.’⁴ The architectural forfeit on these grounds, suggests an architectural neglect which requires a revised way of responding to such pressures.

 Architects are often presented with briefing that requires a project devised with little reference to a master plan or with reference to a master plan that is defunct due to new objectives, funding sources or briefing. Architects need other methods for operating within scenarios where continuity is averted, in order to avoid the ‘forfeit’ and to reinvest in campus ideology.

The focus of this Masters is to consider the implementation phase of a master plan and projects of an additive nature to find other patterns on the campus and possible methods for projecting future development. The additive is the mode of the campus which is of significant interest.

• **Campus typology – privileged coherent urbanism**

The campus is distinguishable, typically, as a rarefied and discrete architectural and urban condition, as a type of city-state. It often exists in (splendid) isolation from the broader environment and has a distinctive ideological and formal agenda as part of an academic tradition of experimentation and objectivity. This gives campuses the privilege of autonomy – for example, Victorian campuses enshrine a campus master plan in local planning bylaws or are almost entirely exempt from planning laws when on public land.

*Michael Bouteloup, Master of Architecture by research project - ADR*
An emblematic architectural coherence is usually sought to define the character and public identity of a campus institution. Such coherence may not necessarily be a result of formal or material continuity – as is the case in the sandstone or bluestone campus. These research projects look for other forms of coherence in architectural language.

- **Rule formation, operation and generation**
The campus was conceived as martialling space at Campus Martius where rules, orders and control were demonstrated, tested and practiced. In the contemporary campus, spatial martialling and architectural operations are now defined by program and briefing, including demographics and the accompanying variety of codes – area schedules, contact hours, entitlements and allowances per student.

The research considers the deployment of rules and limitations on the architecture which are seen to be an inherent mode of fluid contemporary campus making. The rules may be derived from ‘found’ conditions, programmatic studies or ad hoc applications. The mode becomes a discursive architectural logic through the life of a campus and may be used as an authority for resolving multiple competing interests in campus projects.

These three pre-disposed notions of the campus are the premise for the Master’s projects. The proposed projects intend to address and explore these issues as relevant and current questions for architecture in the campus.

- How can architecture address the indeterminacies of the campus within the constraints of fixed briefing?

- How can coherence and identity be maintained on the indeterminate campus?

- How can rules, constraints and limits be applied as architectural tools to assist in addressing these issues?
1.1 Structure of the Research:

Part 1 - Introduction
As described above, the origins of the study occurred within the author’s practice and experience on campuses. The premise is a critical response from these experiences that seeks to highlight an awareness of the paradoxical nature of campus master planning and the usual architectural outcomes.

Part 2 - Conditions of the campus
The history of the campus is explored in a selective discourse ranging from its etymological origins to present day manifestations. The discussion examines the inherent nature and intents of the campus as an ideal urbanism - an ultimate form of master plan - and outlines how some of these intents have changed over time.

In particular, the discussion considers some relevant examples and techniques for addressing and organising growth and also highlights some of the ensuing failings of sprawling post-war campuses. These failings reinforce the view that the role of the master plan is flawed in contemporary campus situations.

The selective history addresses and demonstrates ideas of idealism, emblematics, navigation and experience; ‘mat’ building typology; strategy, tactics and organisation, which provide positive models for exploration of the thesis questions.

The method of employing exemplar projects, either as ideals, precedents or models for collage, is pursued further in Part 4, where pertinent program specific precedents are used. Part 2 also considers a possible methodology (and parallels) for campus architecture as derived from some of the cultural theory of Michel de Certeau.

Part 3 - Projects in Practice
A range of architectural work has been conducted by the author on various campuses and a number of traits and responses in this design work became evident.

These have been summarised into a series of common design responses in two projects which are briefly documented in this section for further development and evaluation in the design projects.

Part 4 - Speculative Projects
The research addresses three speculative ‘additive’ projects within differing campus contexts in order to explore the thesis issues.

The program for each project has been provided either by an existing master plan or briefing documents for a proposed project. The projects are therefore treated as contemporary and anticipated (to varying extents) as an intervention or addition within existing campus constraints.

The knowledge gained in practice work and the campus discourse are each necessary as precedents in the design exploration of the thesis issues identified.

It is considered that the research projects require the rigours of contemporary program and briefing as the critical paradigm has evolved from practice based issues. By locating the projects within an existing master plan or implementation framework, the projects have an opportunity to respond critically.

The three projects are to be on varying campus types – school, training and University to elicit responses to the differences in campus program and scale. The research outcomes for each project are intended to be cumulative as they draw from preceding explorations.

Part 5 - Conclusions
The conclusions reflect upon the design projects and the initial proposition issues in the light of the practice projects and the discourse established in earlier parts.
Diagram showing the structure of the design research:
The three speculative projects are informed by both practice design knowledge and a discourse on the campus considering precedents and origins. The three projects also inform one another to develop the theme and issues in the research.

Michael Bouteloup, Master of Architecture by research project - AUD
Part 2 – Conditions of the campus

Campus etymology and history:
The origins and history of the idea of the campus are highlighted in the etymology which can be summarised in the following:

Martialling space
The term campus derives from ‘field’ (L. ‘open field, battlefield’ from camp ‘open space for military exercise’) originating in Roman military installations and is similar to the term ‘phalanx’ as an organization and manoeuvre of soldiers. (Phalanx as the derivation of the ideal community of the phalanstery). Campus was first used in a college sense at Princeton University, (previously College of New Jersey, 1746) as a transformation of the Italian word ‘campo’, meaning shaped piazza, court or pitch (ie. campo da fennis).

Civic space
The first use of ‘camp’ in a non-military sense was the 1560 meaning ‘body of adherents of a doctrine or cause’, which is clearly pertinent in the educational context. The German ‘kampf’ (also from camp) refers more directly to ‘battle’ or ‘struggle’. Campus Martius (Mars, the God of War) in ancient Rome was initially a martial space for comitia centuriata, civic meetings with weapons. This developed from 55bc into a civic realm with theaters, circuses and monuments, which were the venue for Senate meetings and elections.

Landscape Space
In some languages field is translated as ‘corner’, ‘bend’ or ‘island in a river’ this likely stems from the Tiber River in Rome where Campus Martius was located and brings the geographical (and landscape) imperative to campus. Landscape architects have been integral in the idealistic early development of the campus.

These three readings of the term campus are mutually constructive in considering campus architecture in these terms: as a ‘ground’ or landscape in a figure-ground relationship; as a space for exercises, contest, manoeuvre and organisation, or thirdly, as a civic space for doctrines, political representation and ideology. The ideas of the campus form an umbrella over the research work. These three ideas of the campus are drawn into the research and specifically inform the thesis issues by considering the intrinsic purpose for these spaces and a tradition that is consistent with the campus throughout its history.

Michael Bouteloup, Master of Architecture by research project – ADR
Campus traits

The general traits of the campus characterize a discrete micro-urbanism with specific parameters, privileged and responsible to its constituents and the ‘village’ community that it supports. Traditionally, the privileged nature of the campus would address many of the components of the city: housing, workspace, entertainment, transport, infrastructure etc, without the vicissitudes inherent with freehold property rights of city landowners. The twentieth century use of the word campus, also comprises institutional and corporate properties, territories under single ownership or a single organization. In many of these instances, campus architecture (and landscape) would be commissioned to imbue the key public qualities of such an organization.

This autonomy of the campus to create rules and organization distinct from the city provides an authority for experimentation and the induction of new urban rules or patterns. This induced urbanity operates in the realm of architectural syntax, ie. a rule based arrangement or exposition of rules.

Idealism

The common association of campus with universities was entrenched in the birth of American campus planning at Thomas Jefferson’s ‘academical village’ at the University of Virginia (1817-1828). It was here that the Jeffersonian idealism was manifest as a cultural evolution of European civic space in the virginal American countryside. In a village designed to reflect a life of enlightened learning, the library - modelled on the Pantheon - supercedes a religious building as the culmination of the civic space. The Lawn is a flowing informal agora, a civic space in the uncultivated countryside defined by its partial enclosure and axial nature.

The University of Virginia and subsequent American Universities defined campus urbanism as a unique new world evolution which Verner Hegemann identified as being entirely different from the formal and figural public space of European urbanism (for example, Camillo Sitte’s work). It was seen as a fluid urbanism based on an incremental arrangement of buildings in the ground. Michael Sorkin also refers to the campus as ‘America’s most successful urbanism’ where early campus planning was based on the academic experiment, seeking autonomy and objectivity.
In the beaux arts campus, symmetry, axial and formal geometries govern the organisation of the whole and strive for a closed form of completeness. The nature of the rules which govern the contemporary campus seek an open expandable form with new relationships between the parts:

In Cordoba for example, independent elements are combined additively to form an indeterminate whole. The local syntax is fixed, there is no overarching geometric scaffolding. Parts are not fragments of wholes, but simply parts...Field configurations are inherently expandable; the possibility of incremental growth is anticipated in the mathematical relations of the parts.\(^{12}\)

**Emblematic – open network**
From Jefferson’s lawn which became an emblematic civic space, campuses grew and came to represent a collection of buildings around an interconnected set of voids. In these examples it is the open space that defines the campus more than the figure of the buildings. These spaces framed by built form, metaphorically represented knowledge as a network of inhabited space (campus as a brain). The quadrangle for example, was a simple organising device which could be incrementally achieved and extended infinitely. Similarly, in the corporate environment, the campus as an organisation was extended to become a network and series of ‘connected’ institutions (campus as computer). These examples are similar to Cordoba mosque and define the campus as a field or ‘mat’ institution.\(^ {13}\) The mat type is based on linear service spaces and circulation zones called the ‘stem’, which were organised in larger systems as ‘webs’. The spaces around the stems and webs were designed to be flexible for a range of different functions.\(^ {14}\)

The issue of ‘flexibility’ and the possibility for architectural structures and systems to allow for change over time was a modernist goal in the design of institutions, coinciding in the 1960’s with the science of programming. Programming became the extension of the modernist scientific analysis in briefing of large scale projects, flexible solutions ranged from the multi-purpose space (eg. cafeteria + auditorium = cafetorium) to the plug-in city ideas of Archigram\(^ {15}\).
Organic logic – Navigation and experience
Eero and Eliel Saarinen’s 1945 General Motors Technical Centre project in Michigan addressed the image-making agenda of the corporation. The campus style buildings were designed as part of a dispersed entity that was experienced by circumnavigating a large artificial lake in an automobile. The lake served to visually enhance the experience of the long and low (three storey) buildings as well as providing unity to the complex. The overall facility was deliberately fragmented into roughly equal components to diminish any sense of hierarchy in the corporate structure, and also to generate a modular and filmic experience. Each building demonstrated an evolution in the curtain façade glazing system that maintained a visual unity. The unity was best experienced at 30 miles per hour, in Saarinen’s view, and was complete with reflections in the façades of consumers in their vehicles traversing the campus.

The experience, the construction techniques, engineering, and organization of the corporation are logically integrated in this suite of buildings as an ‘integrated organism’ where the architecture and the corporation are the same and could evolve together, allow constant change within the buildings in the same way that the automobile product would be re-styled annually in a planned obsolescence.

The contemporary education campus exudes similarities with the corporate world, not only in the fact that education has become a global business, with increasingly blurred boundaries between the autonomy and objectivity of research and commercial enterprise. The education campus is also reinventing the pedagogy of educational delivery which is compelling architects to consider the organic integration of these methods. Although, the new pedagogies are evident generally in simplistic planimetric configurations, there is the scope for far broader architectural engagement with pedagogical approaches.

Post war campus – sprawl, decentralisation – the fall
In 1998, the University of Chicago commissioned Michael Sorkin Studio to produce an ‘alternative’ master plan for the campus, although the commission was prematurely cancelled. Sorkin persisted with the ‘unsolicited’ proposal, the research was subsequently published. He addresses a key problematic in the master planning process where the elements and attitudes that inevitably produce under wrought master plans, paradoxically, are the necessary features of master planning. The reliance on programmatic concerns in a master plan is often not
architectural, but merely a plan of space allocation that is reduced architecturally to a fiscal document or strategic business projection. Inevitably, this produces discrete buildings with assigned locations that encroach on space between them without considering the spatial ‘ground’ impact of the additive process.

Eero Saarinen has expressed similar dissatisfaction with the longevity and authority of the master plan where he cites other architects whom ask their clients ‘you decide where it should go?’ in relation to a new project destined usually for an area of the site with the most available space.

Stefanos Polyzoides suggests that the American tradition of campus making ‘is an invaluable source of coherence and meaning’ fundamental to American society as a whole. Ironically, the impetus for sprawl and diminishing campus coherence in rapidly growing campuses was provided by the master plan, and its failure. The early American campuses were designed around a focused space and were compact in comparison with today’s multi-disciplinary campuses. The master plan became a necessity for growth in facilities. However, Polyzoides points out the modern master plan would avoid the key tenet of the campus:

In the era of the master plan, buildings became the dominant component of campus making. Open space was devalued and landscape was most often used as an after thought…With buildings most often conceived as pieces of a fixed puzzle, the ultimate form of the puzzle was to be achieved by a variety of designers. Buildings were designed in fashionable isolation...

Here, the notion of the campus as an evolving puzzle, apparently without an ultimate form, leaves the campus as a pure and continuing problem.
Coded campus
In describing the project for The City of Culture in Santiago de Compostella in Spain, Peter Eisenman refers to the code as a set of processes which ‘like a DNA code with the possibility of reorganising a context’ can alter the superimposed index of form. Specifically, the code is a device used to generate a three dimensional matrix of form from existing transposed traces (of the medieval figure/ground of Santiago and a modern Cartesian grid). The coding process is derived from ‘regulating lines’ that impart either a three dimensional flow or deformation. The reference is made to ‘ley lines’ as a set of arcane cosmological principles that are ‘found’ on the site as historical conceptual rules22.

The idea of the DNA code in architecture has similarly been discussed by the now disbanded Field Consultants. The unbuilt Bandstand City Square Melbourne project refers to the DNA of the city as specific localised architectural fragments. The memories are manifest as traces evident in the detail and tactilic quality of the bandstands. The re-configuration of the DNA is done via the sequential drawing process and is seen to be an archaeological highlighting of history.23

This brief history including some significant campus-like projects is relevant to the design research as the examples address a range of issues which are integral to the campus typology. They highlight the ideology of the campus and appropriation of the architecture to suit, for example, corporate or other ideologies. Some key formal structures of the campus are considered as precedents in the ‘organisation’ of form and program. Importantly the discussion reinforces the problematic in the late modern campus, particularly of growth, planning, programming and rapid change.
Strategies and Tactics
This research was originally couched in the dialectic between Master plan and Addition – which are opposed forces in the realisation of the campus. As a secondary framework to the research it is interesting to consider Michel de Certeau’s distinction between the concepts of strategy and tactics relative to this campus dialectic.

Certeau links “strategies” with institutions and structures of power, while “tactics” are utilized by individuals to create space for themselves in environments defined by strategies. Certeau’s work discusses such power relationships in the context of production and consumption – television, newspapers, supermarkets, urban planning – where consumers cross these organisations in ‘indeterminate trajectories’. The tactic, like the addition is something that occurs over time:

‘Cross cuts, fragments, cracks and lucky hits in the framework of a system, consumers’ ways of operating are the practical equivalents of wit’ 24 (as a tactic, of surprise).

Similarly, a Master plan is a strategy (or the dominant order) and the addition is a tactic which is employed over time to affect the strategy for specific needs. A polemic occurs in the struggle between these two modes.

About Strategy:
The now ubiquitous reference to ‘strategy’ (and hence tactics) from business parlance in architectural discussion is of particular interest when relating to campus projects.

Strategy is about war and its conduct, it is also an act of policy (of which violence is a subset), yet it is seen as generative policy. War reflects ‘the nature of states and societies as they are determined by their times and prevailing conditions’. 25 Similarly the campus may be read as a city state and the architecture is determined by the prevailing conditions. Martialling and organisation of space – via rules, tacit, appropriated or applied - is dependant on a concerted response to the ‘prevailing conditions’ whether they are projected or current. Such organisation may imbue the identity and coherence of a campus and may also be a means to campus responsiveness when changes occur.
Part 3 – Campus Projects in practice

The following two projects, Ringwood Secondary College Additions and alterations (RSC), and St Michael’s Grammar School – Stage 1 (St Michael’s) were undertaken by the author on Melbourne school campuses whilst employed at Architectus Melbourne (2001-2005). Amongst a series of other projects and work undertaken in employment at this practice and others during the course of the research, these two projects identify common campus design responses. Some key issues for the research arise as design intent within these projects and are summarised together with the author’s statement for each project. The statements are paraphrased from published articles and serve to introduce the author’s design practice work as architecture with specific interest in reworking context, history and perception.

These projects introduce a number of current tendencies, observations and tropes on the campus which are taken as opportunities manifest in the architectural outcomes.

i.) **SUBSUMING**: The practice of an addition subsuming and diminishing the significance of the original. This becomes ‘hyperaccretion’ in the extreme circumstances where multiple additions have formally overwhelmed the original.

*St Michael’s*: The super scaled addition of another hipped roof to the rear of a St Kilda mansion serves to re-orient the building frontage and symmetry of the new whole.

*RSC*: The Music and Drama addition becomes part of the gymnasium / hall building, the product of no less than eight individual pieces (with more planned); architecturally it is an agglomeration.

ii.) **OPEN SPACE/VOID**: The protection of open space and volume, and the use of the leftover area around the open volumes to define the building envelope.

*St Michael’s*: This is most evident where the limited site area requires sunlight penetration, setbacks and protection of open space. A three storey void space is proposed to be extended as an omega plan around which future development would occur.
RSC: Similarly, the penetration through the entrance façade of the Administration building allows for a particular pedestrian route to be maintained on the site.

iii.) **ARCHITECTURAL SYNTAX:** the rule based arrangement of architectural form.

St Michael’s: The architectural solutions and forms refer heavily to the existing urban syntax of St Kilda and the reconfiguration of these. This causes a blending of the language of the ‘private’ campus and the ‘public’ local area according to appropriated urban rules.

RSC: The architectural forms are prosaically derived from the simple pavilions and roof types on the site and manipulated to address programmatic needs.

iv.) **UNIVERSAL ADJACENCY:** The necessity for spatial density or proximity and conjoined program. In some circumstances it becomes a universal adjacency which is manifest in a deep floor plate.

RSC: The Music and Drama addition programmatically conjoined with existing hall, stage, toilets and change rooms. Similarly, staff work areas require covered proximity with main Administration.

St Michael’s: Circulation spaces are conjoined through existing buildings. Multi-purpose ‘team teaching’ area centralised within the program creating an active deep floor plate.

v.) **CONTIGUOUS FORM:** The collection of buildings (and program types) within a single continuous form. This is often in response to the requirement of programmatic adjacency and to create a ‘unified’ suite of buildings.

RSC: Administration addition, where the roof form acts as infrastructure under which enclosure is added as funding permits.

**ARCHITECTURAL SYNTAX:** St Michael’s Grammar School - Local “six-pack” apartment syntax - Chapel Street St Kilda.

**ARCHITECTURAL SYNTAX:** RSC - reworking the pitched roof pavilion.

**ARCHITECTURAL SYNTAX:** St Michael’s Grammar School - adjacency and conjoined buildings. Conjoined circulation highlighted red, future conjoined circulation highlighted blue.

Architect’s Statement:
The two additions at Ringwood employ the existing architectural language and types which have accrued on the campus; they work within the mode of the prosaic and additive as programmatic ‘growth’ upon existing infrastructure. The project attempts two strategies of accretive architectural production: the self-generative and the structured compromise. Both have an overlying system, of an abstracted vision field which is culturally and site specific. The recent history of Australian contemporary art has not only dealt with the suburb as a source of subject matter but also as a means for engaging with international styles (Pop art, minimalism, colour field abstraction, Op art etc). Artists such as Dale Hickey, (whose fence installations parodied Donald Judd) Robert Rooney, Ian Burns and Howard Arkley satirised American formalism and minimalism with suburban reference and motif in an ironic capacity. The façade treatment in each addition gives credence to the work of these artists and to the crepuscular abstract colour field of the suburban landscape.

This forms an idealised vision for this campus as an abstract visual condition informed by an accretive anti-formalesque method.

The Music and Drama addition acts as a monument to the primary LTC format extrusion. Within the idiom of the six degree timber-framed gable roof, the form is manipulated in plan and section as required. The addition is programmatically conjoined with the composite Hall/gymnasium structure and is articulated as yet another piece on the largest conglomeration of buildings on the site, (eight separately designed pieces, with future additions mooted). The gable of the addition is dragged off-centre to provide the required height in the Multi-Purpose Room to the North. Internally a large foyer punctuated by a dropped sky lit bulkhead distinguishes the addition from the existing.

Externally, the façade anticipates the heat haze effect across large expanses of bitumen with exaggerated oscillating windows, pre-empting a tendency to squint when viewing the building, thus stimulating high frequency visual processing. A square relief, as a series of incrementally overlapping frames, pays some homage to the bold graphic banding of the former Caulfield Institute of Technology (Percy Everett, PWD, 1950). The façade creates a theatrical sense of denouement as a backdrop to large outdoor play spaces emphasised as the figure returns around the corner. The Western facade is delineated in black corrugated roof sheeting, forecasting future additions to the North West and highlighting the addition as being distended from the LTC extrusion.

A second addition is an Administration building which presents a new front of house on Bedford road for the school, it uses a more recently established language of the valley gutter roof. The long tapering roof plane inclines into the campus and is painted in a signal-type yellow to read externally as a gash in the building, or as two buildings with the same roof. Edmond and Corrigan’s nearby Ringwood Plaza and Library (1995) also employs a similar strategy of collecting program as islands under a greater common urban roof form. The punctured form of the Administration building allows separate public and user entrance points and for existing campus pedestrian flows to be maintained. The cladding of the ‘garage’ is old-school masonry veneer tile with a pattern formed to emulate the visual effect of the Ponzo illusion. The effect is tested in a three dimensional condition where the converging lines distort the sense of scale and perspective of the windows which lay vertically across them. The graphic also registers the tapering of the overall form and serves to direct visitors into the campus at a roadside scale.

excerpt of article by Michael Bouteloup published in Subaud 05

CONTIGUOUS FORM: Ringwood Secondary College - Administration building
3.2 St Michael’s Grammar School – Stage 1, The Sisters’ Building (2002-2005)

Shadrach Woods has referred to the “city as a school”; similarly the new building at St Michael’s Grammar School is treated as an extension of the existing urban system of St Kilda. The diverse urban context of six-pack blocks, mansion and ecclesiastical buildings are reconfigured to create a variety of charged urban spaces in and around the building. The building form and footprint is derived in response to setbacks, existing open space, circulation space, and a required connectivity of facilities. Within the envelope, a surprisingly large series of classrooms, offices, gallery, open space and car parking are enmeshed with the greater urban fabric.

Circulation space is regarded as urban: stairs at either end of the building are self-evident appendages, (not unlike many St Kilda apartment buildings) and are treated to heighten the experience of vertical circulation. An inverted polychromatic brick (like the negative banded brick of Albert Purchas’ nearby church) defines the front; an optically dynamic screen (in bronze and white vestment colours as an oversized rood screen) prevents overlooking of neighbours deeper in the block. Charles Fourier’s arcades are employed to enshrine external circulation space as a three storey communal volume, providing an omega plan template for future development. The arcade is created in section where the balconies step back on each level to maximise sunlight into existing classrooms and provide natural convective ventilation.

An asymmetrical Northern façade (addressing a re-oriented street front garden) is generated as a six-pack mimicry of the ‘Boom style’ street frontages of St Kilda’s mansions, however, the typical bay window format operates in section rather than in plan. The curtain wall glazing of the six-pack distends from the prism to provide window shading and adjust to spandrel requirements. Landscaping in the manner of a Parisian boulevard (Rush Wright Associates) completes the ‘modelled’ space for learning, with the school motto emblazoned on the path labelling the project in a Duchampian manner.

Architect’s Statement by Michael Bouteloup as published in Architecture Review Australia Issue 096 City Building p.62
ARCHITECTURAL SYNTAX: St Michael’s Grammar School Arcade - 6 pack syntax

OPEN SPACE: St Michael’s Grammar School Arcade - 3D void
Part 4 – Speculative Projects

The following speculative design projects are intended as cumulative projects which develop from one another and from the research in the preceding parts. In particular, the projects attempt to engage with the campus typology - by broadly considering the possibilities and implications of martialling, civic and landscape space.

The projects are to consider the campus in flux and as incomplete formal outcomes as a result. They intend to work within a limited brief (and master plan or building envelope where applicable) to explore the potential of the campus traits highlighted in practice work. This includes: growth and hyperaccretion, open space, language and syntax, universal adjacency, the deep floorplate and contiguous form.

The brief (and programmatic outcome) is integral to the design process as this provides for further consideration of the practice design projects and campus precedents discussed.
Project One - Melbourne Grammar School, Melbourne campus

Project Two - Chisholm Institute of TAFE, Berwick campus

Project Three - University of Western Sydney, Parramatta campus
4.1 Project One

New Classroom Building, Melbourne Grammar School, Melbourne Campus

Opposite: Melbourne Grammar School, site highlighted - aerial photograph c2000
Scenario:
The campus has evolved as a series of pavilions progressively evolving since 1858. Initially, the quadrangle grew in increments (including storey by storey), in later years the growth in pavilion width become evident where progressively deeper floor plates were preferred. The campus has recast itself over a 150 year period whilst the landscape imperative of the three ovals has been preserved. Through the post war era, pavilions have evolved around the ovals providing an engagement with the culture of sport as an integral part of the learning institution.29

This project was identified in the school master plan (P. Elliot Architects, Amendment B, 2000) for the future demolition of an existing 1974 building and redevelopment. The existing building is seen to be redundant due to convoluted site access levels and the small scale of spaces.

The project brief is for a new Earth Science building with General Classrooms, staff areas, new changing and toilet facilities for visitors and first teams, and 380 covered lockers are also to be provided.
Project Approach:
This project looks at the issue of indeterminacy on a site that has been entirely redeveloped (on multiple occasions) around the defining space of the ovals and the enduring quadrangle building. The notion of growth and continuum on the site is explored formally through various generative processes that seek to highlight particular cultural, historical and architectural aspects of the site.

As the site is heavily constrained in its overall envelope by the master plan, the project seeks to test applied generative processes on the space of the envelope. The spaces are cut to suit the envelope leaving fractured edges and allowing the system to exist incomplete. The aim is to elucidate points of contest between the dominant (master plan) order and the additive process.

Public and circulation space in the project are treated as a priority and as void space to be enshrined within the extended envelope. The building program is to be maximised within the parameters and is formed by the space left over between the schemes for building envelope, circulation and voids. The program area is to be generic and flexible floor space.

Methodology:
Initially, the master plan envelope is filled out to its logical conclusion - an extruded footprint is then reduced by the equinox sun paths, maintaining sunlight on the hallowed turf of the oval. Subsequently, planning overlay and a symmetrical excision forge the maximum parameters for the building envelope.
Tacit urban principles:
The tacit urban principle is the process of manifestation of an idea that is implicit in an architectural site or program. The manifestation may be based on a latent pre-existing condition, as a spatial construct, a macro condition too large to be evident, or a non-visible condition. For example, the void space of an axis, the ley lines of folk and sporting lore, or a geometric topology.

This project extends the three dimensional topological field of the site from the geometric construct of the existing significant landscape. The conical section which forms the oval is used the oval as derived from a conical section.

The sporting lore and unmarked codes of pitch navigation for cricketers is given a new role in the demarcation of space beyond the boundaries of the oval. Like the navigation of an oval by conceptual ‘ends’, the building provides the ‘late cut classroom’, for example, where navigation of the interior is via the cricketer’s tangible viewpoint. The proposal registers cricket bat wide red leather grooves which act to orient the players and actualize the system of the game.

TUP - demarcation of space according to cricketing lore

TUP - Projection of grid through the MGS conical prism
View from above into void space

View from model cricket square
Collage and Archetype:
A local archetypal campus project is collaged onto the site by a process of projecting it through the conical topology. The use of a local iconic modern building pursues a continuing evolution of the local modernist project. It uses the three dimensional grid as a continuous 'field' within which events and program are contained.

The archetypal project - Frederick Romberg and Robin Boyd’s Sacred Heart Girls’ College, Oakleigh (c.1955) – has resonance as an ideal all-in-one campus building with a range of spatial types (hall, cloister, quadrangle) collected within the structural grid and interconnected volumetrically. The grid is manifest in treatment and exposure of the floor, structure, and glazing. The building can also be seen to be a precursor to the National Gallery of Victoria (NGV), particularly with its double height coloured glazed wall, a treatment of the spatial envelope that was similar to Leonard French’s glass mural ceiling at the NGV.

Collage of SHGC by projection through the MGS conical prism

Sacred Heart Girls College, Oakleigh
Romberg and Boyd, 1955

Sacred Heart Girls College, diagram showing circulation around 3D voids

Sacred Heart Girls College, archive plans showing interlocking 3D voids
An addition was planned to this building which would double the envelope and floor plan and provide an additional courtyard/
Prototypical space:
Reconfigured SHGC circulation and void projected onto the proposal
**Growth methods:**
The raked conical geometry which defines the ellipse of the ground plane is also used as a Cartesian deformation device (D’arcy Thompson and Albert Durher) where growth and evolution occurs as an isotropic evolution of a type (uniform growth). Similarly, allometric growth - the phenomenon whereby parts of the same organism grow at different rates - is tested on circulation space. The circulation space extends along the North of the building allowing for efficiency in egress routes and for sun protection of the classroom areas. The modernist external circulation that is a feature of the site is extended on the street façade in an allometric manner, whereby the structure is affected by three growth types (bell-shaped, exponential and sigmoid growth).

**New Program:**
The use of the web as a teaching tool is almost commonplace for students who respond and learn in new ways. Students inhabit a world full of data-streams, where analysis and decisions come at twitch speed, where failure at first is the norm, and where learning takes place informally. The users are provided with an informal trading floor classroom where real-time problem solving scenarios are enacted by trial and error as part of learning.
Allometry - sigmoid, bell and exponential

D’Arcy Thompson - Puffer-Mola

Allometric growth applied to circulation space

North facade of model with applied allometric circulation
View to Domain Road entrance
Western View across oval
Summary and review

This project addresses the issues of the research by heuristically considering the ‘addition’ project that has a pre-ordained framework within which to operate. The framework (master plan envelope) is retained and embellished but otherwise allowed simply to exist as a shell, in the absence of any other architectural guidance from the master plan.

The issue of campus typology as a privileged coherent urbanism is explored by considering ‘other’ methods of coherence in architectural language. The ‘tacit urban principle’ is an idea that addresses this by looking for other forms of coherence and engagement with the site.

The notion of a ‘tacit urban principle’ is introduced as an exposition of latent site geometry inherent in the site’s topology and history. This provides opportunities to consider and further explore, including further rhetorical questions:

- What are the tacit and unregistered histories on a site that must be manifest?
- What makes these items a principle?
- How can the manifestation be made?

The building as a field and topology (or extension of) is a key to this project, it is relevant in the way that it takes on a self-similar approach to the existing modernist projects and introduces the idea of the campus building as merely a frame or infrastructure which may be applied, with contingencies, to any site.

Collage and extrapolation of an archetypal project is the technique employed which presents a new relationship with the applied model. The model raises the juxtaposition of the work of Grounds Romberg and Boyd with that of Mockridge Stahle and Mitchell, in particular the contrast is evident in the open form Romberg scheme versus the closed system of bluestone end walls by Mockridge.
The interlocked three dimensional spaces of the Romberg original are tested on a site with stricter boundary and orientation constraints, it also extends across three levels rather than two. These compromises and appropriations are consciously allowed to occur, they act as a substitute for the capriciousness of client and user group requirements. They present a ‘just-fit’ solution rather than one tailored for a particular group or brief. The result is a prototypical space of program contained in a matrix.

The program issue is not addressed as a strong architectural technique or as an applied set of rules for the site. The project instead provides a loose / weak envelope (loose fit for function), allowing general purpose classrooms of varying scale within the floorplates.

There are two apparent failings this project has in addressing the research project issues:

- The project is not actually an addition to a building but an insertion in a campus. The terminology used and direction of the masters needs to consider this, as it is the implementation of a current master plan.

- Expansion and growth are not addressed other than as motif in circulation space – and in the termination of the field at its envelope extremities, merely suggesting that extension is possible. They do not pre-empt future additions and growth, this problem is symptomatic of the brief and envelope constraints applied by the master plan.
4.2 Project Two
Technical Education Centre, Chisholm Institute of TAFE, Berwick Campus
Scenario:
This project is a new TAFE technical trade training centre on an outer suburban campus. The existing campus consists of a few single storey brick flat rooved pavilions from the 1970’s that sit in a large open field surrounded by roads. The architectural history of the campus is undistinguished and the surrounding area includes a satellite University campus, a Hospital, and some drive up retail. A small suburban train station exists just to the North of the campus and a direct visual link from the station is desirable.

The brief was provided complete with a detailed area schedule, functional relationships diagram and briefing documents which expressed a need for the building to achieve a new identity and exposure for the campus.

the Berwick TEC brief is for a signature project that fulfills the high standard training objectives of an adaptable, flexible and connected learning hub which promotes integrated training activities in a dynamic open environment.

The mere scale of the building program and volume required is sufficient to achieve the new identity as the campus teaching area is at least doubled by the single new building. The brief requires: vocational training spaces with large external covered areas for trade students, materials storage, general classrooms, administration areas and amenities. A particular emphasis is placed on ‘consolidated services and facilities’ and for flexible and collaborative learning spaces.

Project Approach:
In this project, rules are deployed to provide a pure strategy and means of organising the campus in the considered absence of context, topology or ideation of the campus. There is no tacit urban principle, just the weak vagaries of rambling suburban road layouts, reflected in the sprawling institutional projects nearby.

The project is considered as a mat building – conceived of via program studies in density according to applied rules. Candilis, Josic and Woods stem system of service and travel space is reconstituted in this proposal.
Methodology:
The architecture evolves from the deployment of found rules and principles that address efficiency and optimization, together with a puzzle like approach to the problems of the brief.

Optimisation:
The perennial issue of efficiency in TAFE projects demands a scientific attitude towards the program to assess the formulaic brief for efficiency of floor to wall ratio and reducing wasted space.

The brief was treated as a problem – in this case of Integer Square Packing (also known as Optimal Quilting). The program was assessed, squared and packed into a 28x28 square plan solution (4sqm/student in for trade training) that retained the required functional diagram – achieved in part as a result of the super adjacency created by the packing process. The 28x28 squares was multiplied by 4sqm units (ie. 56m x 56m floorplate) then divided into squares to match the required scale of a selected order 11 quilt of length 28 (ie 11 program elements).

The packed Gross program was subjected to the educational problem of extracting key learning spaces from the regimented TAFE funding model (for the limited generic classroom space only). Grossing area (at 24%) was subtracted from GFA to account for the breakout areas, common areas, computer labs, amenities and circulation. These spaces are conjoined in a continuous ‘common’ breakout space as a mode three learning informal learning space.\(^3\)

Excerpt from TAFE Design Standards - General classroom
Generic typically funded space - limited teaching mode.

---

**DEPARTMENTAL TEACHING SPACE**

| Number of Program areas: | 28x28 = 784 | Suit Pattern 1
|--------------------------|-------------|----------------
| 1 and 2                  | 225         | 15
| 3                        | 169         | 13
| 4 and 3                  | 81          | 9
| 5                        | 49          | 7
| 6 and 8                  | 36          | 6
| 9 and 11                 | 25          | 5
| 10                        | 16          | 4

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<th>UFA</th>
<th>Grossing</th>
<th>GFA</th>
<th>%</th>
<th>Rounded</th>
<th>No of squares</th>
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<td>4%</td>
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<td>22</td>
<td>22</td>
<td>2.1</td>
<td>172</td>
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<tr>
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<td>30</td>
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<td>1.3</td>
<td>63</td>
</tr>
<tr>
<td>10 and 11</td>
<td>235</td>
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<td>9</td>
<td>9</td>
<td>0.9</td>
<td>71</td>
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Analysis of the brief - UFA as a rounded % of the overall brief to match a quilt pattern suiting 28x28 squares of 4sqm each.
Integer Square Packing / Optimal Quilting:

A quilt is a square made from smaller integer squares - 'the brief'
The order of a quilt is the number of smaller squares - 'Number of program types' (11)
The size is the edge length $n$ of the full quilt - $n = \sqrt{\text{GFA}}/4 = 28$

Problem for Chisholm TAFE Berwick:
- to find an order 11 solution for quilt of size 28 x 28 squares (at 4sqm each)
- i.e. 11 program areas in 56m x 56m square plan
Circulation – Snake Problem

The snake problem provided a limit for the operation of subtracting grossing area. Like the Berlin Free University ‘stem’ the snake is a support system, linking locations and accommodating activity and interaction, although devised by substraction rather than existing at the commencement of the design process. A two storey space of 14m lengths, they are oriented on 90 or 30 degree angles to provide a continuous uncrossing spatial structure for perambulating, discussing, connecting and learning - not mere servant space. Vertical circulation occurs with break-in points at snake junctions where thermal chimney, stairs and common facilities can be located.

Lyons early TAFE projects consider the idea of circulation as a taught, graphic suburban mall space. Borland’s Clyde Cameron College considered circulation as politically representative – a manifestation of trade and unionisation – a true campus in the Jeffersonian sense. These two seminal buildings form each end of an era in Australian/Melbourne architecture. The circulation section plays homage to these precedents within the mode of the snake problem.

Growth

Future expansion and flexibility is not evident within the specific and a rigorous brief. However, should the inevitable need for expansion be considered, it would rely on a finite extension to the brief and area scope in order for the packing system to work.

Future expansion may also be defined by the trajectory of the Rule 30 cellular automata that defines the three dimensional roof extending in an endless hankchief surface. Rule 30 is a primitive binary rule, as it ‘grows’ it can produce patterns and behaviour of immense complexity and claims to be a new understanding of natural phenomena. Rule 30 is defined by 2x2 square meter cells which equate to the area equivalent per student from the Design Student Capacity in the project brief, (excluding amenities and circulation).
Circulation

Snake on a plane problem -
A snake is a sequence of unit line segments that are non-overlapping except that each one begins where the previous one ends. A $d$ degree snake is a snake all of whose angles with the horizontal are multiples of $d$. We are interested in the longest $d$ degree snake that will fit inside a square of side $s$.

At Chisholm Berwick the snake problem is:
$s=3/2, d=30$
length 10
(found at http://www2.stetson.edu/~efriedma/mathmagic/0503.html)
Growth and master plan possibilities

- Optimised plan: solution
- Frequent program change
- Solution under 1m, 26m x 20m
- Program group

- Possible program growth
- Trade training
- General teaching
- Health teaching

- Possible program growth
- Double size
- Axial and symmetry

- Specialised program growth
- Perfect symmetry
- Rectangular
- Solution group 12: 105m x 105m
- Program group

Notional master plan and siting

Michael Bouteloup, Master of Architecture by research project - ABK
View looking North West
Aerial View looking South showing Kule 3U roofscape
Summary and review

The project approach avoids the notion of tacit urban principles from the previous project, instead opting for a strategy of generation by application of rules that may seem ad hoc to the architectural project. Rule formation is the key issue of the research addressed in this project. It uses the science of programming as an idea for the martialling and organisation of space into strict confines and expedient space.

This project is unencumbered by planning or site precedence and therefore when considered with the project at Melbourne Grammar School, this project uses one scale of generation for both the envelope and the internal arrangement. There is a closer form-fit in this project as a result.

The difficulty raised by this project relative to the research issues is (initially) that of poor site engagement. The building floats in a ‘site-less’ manner, emphasising its aloof generative intent – like the transgressive modernist project. This project demonstrates that whilst a master plan is not necessary on this site (as discussed at the start of this dissertation), the building proposal needs to address growth and future projections to make a contribution to the thesis issues – of indeterminacy.

In this respect, the building should either project a strategy for future growth and in effect becomes a master plan by extending the proposed packing system of organisation, or should be arranged as a terminal free standing building which engages in the way it is arranged relative to existing buildings and open space.

The project’s design methodology is a significantly different approach to the Melbourne Grammar School project. The third project should attempt to use the research and methods from each of the first two projects to see if such techniques are transferable across different campuses.
View of Western facade - roadside

View of Southern edge
Site Plan with Notional Master strategy shown ghosted.
4.3 Project Three
Hub Building, University of Western Sydney, Parramatta Campus
Scenario:
The Parramatta site, has a long history of appropriated architecture from 1813 to present where various institutions occupied and expanded the building stock – from Female Orphan School, Protestant Orphan School, to Hospital for the Mentally ill and eventually a University campus. The site also has the oldest three storey structure in Australia. The majority of buildings on the site are pitched roof pavilions, these are the standard type on the site, the heights vary from one to three levels, usually with limited eaves. The largest being the original orphanage in a stripped Palladian style with two storey wings behind. Late twentieth century additions to the campus are quite evident in plan as huge deep floor plate buildings accommodating new educational program such as faculty learning spaces, a library and theatres.

The site represents a scattering of orientation and architectural language due to the changes in institutional models. A gardenesque or picturesque landscape is also apparent on the site in the arrangement of buildings, landscape, gardens and footpaths, this stems from the rehabilitation program when the site was a hospital.

This project was an open architectural competition (since abandoned by the convenor) for a new hub building. The brief included areas for student services, retail outlets, bar, bookshop, computer lounge, convocation rooms, student support shopfront, seminar and multi-purpose rooms for staff and students, health services and secure rooms. The brief included a pre-defined footprint and a two storey height limit, it also required the integration of a heritage listed brick tower and pitched roof building (previously the site laundry).

The brief des not provide a master plan or any broader governing principle except that the hub building is appropriate on this footprint due to its central location. The circular footprint that constrains the envelope is no doubt symptomatic of the building as a ‘hub’. The circular footprint is not only incongruent with the rest of the site but presents some floor planning questions particularly when the entire program (3550 m²) is to be condensed over two floors constrained by the footprint (2150 m²) and the existing buildings to be retained.

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<tr>
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| TOTAL                                     | 3550   |
1791 Arthur’s Hill Farm  1814-1870 Orphan School  1870-1894  
Sequence of architectural appropriation of the site  

Proposed Site Plan 2009
Proposed Site Roof Plan

Michael Bouteloup, Master of Architecture by research project - ADR
Project Approach:
This project shall consider the three issues of the masters and employ a methodology that derives from the preceding two projects, in particular, the tacit urban principle and other applied rule making devices. The site and brief limitations are again to be followed to seek a new outcome from inherent site and brief limitations.

Methodology:
As the project is using a dual approach of ‘found’ rules (tacit urban principles) and ‘applied’ rules, these techniques are classified into strategies and tactics to consider the ideas of Micheld de Certeau, and that two orders or ways of behaving (architecturally) might occur on the site as a power structure.

Strategies
The existing architectural syntax of the site is identified as architectural rules which create an order and have a strategic role on the campus in the absence of a master plan. The existing syntaxes of the site that are to be used include: picturesque landscape; symmetry and asymmetry; pitched roof gabled pavilions.

Symmetry / Asymmetry – the project is a structured informal object which is similar to the adjacent Federation hall, a building that houses similar social activity functions, and uses a Queen Anne domestic free classical style. The two dense floor plates are treated with varying symmetrical orientations (Ground Floor due North, and First Floor North-West aligned with the suggested campus point of entry). The two symmetries are exposed in the central void and circulation spaces.

One of Boullee’s inner domes (c1880’s) is applied to the site as a contextualising device and to provide a blurred symmetrical reference point. The period of enlightenment in Europe that spawned Boullee’s idealistic projects were contemporary with Australia’s new institutionalisation of the disenfranchised.
**Landscape**
The building is designed as a traversable building, as an extension of the existing oblique footpath arrangement allowing new paths to bisect the site. The building becomes a route as well as a destination, thereby maximising the exposure of retail on ground floor. The public paths provide shelter for students and also blur the public and private boundaries giving the building a constant activity. As the building is traversed it is constantly changing in the picturesque manner when viewed peripatetically by users in constant motion. A broad primary geometry is applied to the double storey walls of the public paths in a manner similar to Richard Serra’s torqued landscape installations. The walls are embellished with the ‘natural’ Rule 30 acoustic wall treatment.

**Deep Floor plate**
Stirling’s Engineering building at Leicester University is an exemplar deep floor plate building with free spanning roof trusses all of ‘found’ standardised prefabricated product. This project is referenced in the section as a ceiling and roof structure. The ceiling is intended as an active ventilator and insulation space admitting filtered light and cooling or heating to the volumes below it.

**Tactics**
Tactical rules are employed on two scales: at specific small scale program, for example, joinery and table layouts which are immediately appropriable by users; and at the large scale in the manipulation of the roof surface. The goal is for the tactics to re-appropriate the syntax of the site for its own ends – consistent with the history of the site which has been re-appropriated by various institutions. An ordering syntax (of pitched roofs, landscape and symmetries) should allow ‘cross cuts, fragments, and cracks’ in the system. 

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Richard Serra’s Clara Clara

View from First floor down pedestrian path

Embellishment of proposed pedestrian paths
North Elevation
Section through circulation showing vented roof space
Ground Floor Plan

- BOOKSHOP 250
- NEWSAGENT 50
- COMPUTER LOUNGE 50
- LOADING DOCK 100
- STUDENT SUPPORT SHOPFRONT 60
- RESTROOMS 50
- BAR 50
- EXHIBITION 50
- TRAVEL AGENT 30
- CD-RIP MARKETPLACE 200
- RETAIL 220
- CAFETERIA, CAFE & KITCHEN 360

First Floor Plan

- MULTIPURPOSE SPACE
- STUDENT SERVICES - OFFICES
- STUDENT SERVICES - MEETING
- STAFF FUNCTION ROOM
- STUDENT FUNCTION ROOM
- RESTROOMS
- DECK
- SAFE ROOM
- WOMEN'S ROOM
- COMPUTER LOUNGE
- STORE
**Grid Plan Manoeuvres** - The Knight’s tour is the problem that provides a process for the trajectory of Boullee’s dome. The evidence of the behaviour of this can be found on the continuous ceiling line, highlighting the manoeuvres and blurring the centre. The trajectory of the Knight’s tour in the roof form provides a continuous (tent like) ceiling surface appropriate for a communal building.

**Swarm intelligence**

In an effort to pre-empt the programmatic usage of distributed elements such as the computer access stations and furniture, these items are treated like boids and given fields of adjacency in the floor treatment.

North West view through torqued ‘landscape’ path
Leicester University Engineering Building, J. Stirling 1959

Roofscape view looking North West
Program
The challenges in the brief, which include housing the functional relationships required within a strict envelope form and size, have been addressed with some blurring of program areas and definition allowing for sharing of space between the functions. External space, social and retail space are consolidated into a single programatic type where they overlap and bleed with the circulation space as though parts of the building are an extension of the landscape and external social space of the campus.
Elevated view looking North West
Internal view looking North through pedestrian route
Summary and review
This project has integrated the techniques of the earlier two projects – tacit urban principle and generative rules, it demonstrates the discursive logic of appropriating rules and devices to suit architectural problems.

These principles and rule systems are tested in combination with the moments of contest exposed where the behavioural gabled roofscape is abruptly trimmed by the required building envelope.

This project raises the idea of architecture on campus providing a trajectory at both the large scale of entire buildings (as demonstrated in the history of the site) and at the micro scale of tables, chairs and joinery which may be pulled together or around a space to suit individuals and small groups. The Knight’s tour roof form may also be continued or extended to other larger deep floorplate projects for an expansion of the communal space and campus coherence. The project considers the deep floor plate building by breaking it down into a ‘field’ (for movement) that is navigable and part of a broader system.

The theory of Certeau’s strategies and tactics can be a valid way to understand a campus and provides parallels between tacit urban principles and other applied rules as both may be seen as a strategy or a tactic depending in which capacity it is working; either with or against an original order.
Part 5 - Conclusions - Reflection on the research

In making conclusions on the research I will summarise the research development, the relationships and differences between the projects, the major design responses and how the initial questions, the discourse and the practice work have been connected and furthered.

Development of the Research:
The main theme of the research was developed via the course of the work. Initially the research considered present-day campuses as conceived in two contrary and opposing manners: by master plan and by addition (or implementation). The research originally proposed design projects that might try to address this dichotomy. Whilst this remains broadly as an intent, the ability to design within two scales became increasingly infeasible. Hence, the projects were devised as additive projects working with the constraints provided by a brief, site and existing master plan.

The projects were not intended to design beyond the briefing provided, (ie. projecting any future development) which was assumed as unknown and indeterminable (Project 2 is an exception, it explored the possibilities of the optimisation process in a simplistic future framework). The suspicions held around the validity and longevity of the contemporary master plan (as discussed in Part 1) also directed the projects towards the smaller scale.

Project outcomes
The first project at Melbourne Grammar School explores the notion of the tacit urban principle by using innate conditions on the site to inform the architecture from an urban scale. The geometric construct of the landscape provides the main principles for manipulating the building envelope and structure. The collage of an imported ideal was employed to juxtapose the spatial matrix of another modernist reference with the extant modernism on the site. These methods have validity in providing coherence and identity to this particular campus, especially in a landscape sense, similar methods may be considered on other campuses. However, to explore the thesis questions, particularly around the issues of indeterminacy and identity, the second project deliberately chose a comparatively young campus devoid of an apparent significant context.

The second project is an exurban TAFE training campus with limited site history, here the tacit urban principle is not used as a generator for the project. The detailed constraints provided in area allowances and required relationships were explored to generate applied rules for the proposal based on expediency. In this project, a single scale of generation was applied for both the envelope and the internal arrangement. This differentiates it from the Melbourne Grammar project and limits the areas where contested strategies are evident (ie. at the envelope boundaries). This project is an exercise in program as ‘problem’ and demonstrates that architectural and programmatic solutions are compatible with some mathematical rules in a digrammatic martialling of space.

The third project is a university campus with a history of appropriation by different institutional types, here the techniques from the first two projects are tested in combination. They are used selectively and discursively within the prescribed regular envelope which has the benefit of highlighting the formal manoeuvres in a similar manner to the Melbourne Grammar School project. The notion of discursive logic is introduced in this project and is seen to replicate the experience of the changing rules, priorities and politics of users. This design process is selective and ad hoc but the design decisions address the formative ideas of the campus as a landscape, civic and martialling space, by focusing on the public space, the void space and engaging the existing patterns on the campus.
Discourse, Practice and Projects - relationship and development:
The attention to the etymology of the term 'campus' led to a tripartite understanding of this word (Martalling, Civic and Landscape space). Each of these found parallels with the precedent examples considered and examined in Part 2, and this extended through to the major design responses in the project work as described in the diagram above.

Part 2 - The historical review of the campus explored and refined the project issues by reviewing campus typology and examples of architectural organisation on campus. This section also provides evidence of some of the misgivings about master planning that reinforce the contemporary problematic of indeterminacy and master planning.

Part 3 - The body of work undertaken in practice addressed some specific contemporary conditions of accretion, growth and program density - as well as campus traits which have grounding in historical precedent; these include: pedestrianised figural space, organisation around infrastructure or service; and the use of rules employed for architectural language on campuses.

An overall discourse diagram (shown on the following page) attempts to describe the relationships between the various components of the research including the elements of practice work. As the diagram implies, the historical discourse (top half) and practice work (bottom half) crossover in generating the design issues that are explored in the projects (base of the diagram). The role of the historic, typological and practical precedent is central to the design work, the aim is to develop and rework the successful elements of the precedents to further develop and reinvigorate the campus typology and a mode of design.
Campus discourse etymology and history

Martialling Space:
- Campus: from Latin 'campus', meaning 'field' or 'encampment'.
- Martialling: from Latin 'marmor', meaning 'marble', referring to military camps.

Civic Space:
- Civic: from Latin 'civis', meaning 'citizen'.

Landscape Space:
- Landscape: from Latin 'landscape', meaning 'picture of the land'.

Ground:
- Ground: from Latin 'terra', meaning 'earth'.

IBM HQ Saarinen 1958
- Military-industrial-academic complex - Sen. J.W. Fullbright
- General Motors - Saarinen 1956
- Organic logic

Lyons - Deep floor plate contiguous space ANU JCSMR PMA contiguous circulation space RMIT CS&IT

St Michael's Grammar School (at architectus melbourne)

Martialling Space:
- Campus from 'field' (L. 'open field, battlefield' from camp 'open space for military exercise')
- 'campo', meaning shaped piazza (court or pitch, ie campo da tennis).

Civic Space:
- The first use of 'camp' in a non-military sense was the 1560 meaning 'body of adherents of a doctrine or cause'.

Landscape Space:
- In some languages field is translated as 'corner', 'bend' or 'island in a river'.

Phalanstery - Charles Fourier c. 1800's
- Mat building - Josic Candilles & Woods
- University of Virginia - Lawn T. Jefferson
- University of Chicago, 1892 Quadrangle organisation of knowledge

Phalanstery - Charles Fourier c. 1800's
- Field Building - Cordoba Mosque
- Jeffersonian idealism
- Campus Martius c. 55bc

New figure-ground City of Culture of Galicia, Santiago de Compostela, Eisenman 1999-2012

Growth methods
- Programming
- Procedure / Operation
- Tacit Urban Principle
- Architectural Ideal

Project Issues / Premise:
- Demise of the master plan - 'Strategy is dead. Long live strategy.'
- Indeterminacy - traditional campus master planning is a limited architectural tool;
- Campus typology - privileged coherent urbanism.
- Historically the campus is a defined urban type of a privileged coherent urbanism;
- Rule formation, operation and generation. Rule formation is integral to the campus type.

Open form, Oskar Hansen

Local Educational Architecture

Discourse diagram
The initial research questions:
- How can architecture address the indeterminacies of the campus within the constraints of fixed briefing?
- How can coherence and identity be maintained on the indeterminate campus?
- How can rules, constraints and limits be applied as architectural tools to assist in addressing these issues?

The three tenets of the thesis questions are mutually dependable issues. The diminished status of the master plan and the indeterminate campus directly affects the question of identity and coherence in campus urbanism. Further, the issue of identity and coherence in language can be addressed by the application of rules and generating orders. However, the ultimate concern of the research is the problematic of the method of long term planning on contemporary campuses where the frequently changing institutional goals administer the programmatic and architectural needs at a pace that master planning cannot address. The key implication is: how should architects operate and respond in these situations where universal ordering, or even localised organisation either has no constancy, or does not exist?

Indeterminacy and Program

Whilst an aim of the masters research is to find ways of addressing indeterminacies on the campus, it is a fait accompli that a campus is entirely indeterminate beyond the fixed programmatic brief provided. This fact makes the question moot within the constraints formed by establishing the brief, however the issue of programmed space (ie. interchangeable) is more relevant to the question of indeterminacy in this context.

The program in each project was reviewed, condensed and manipulated to allow a bias towards flexible, multiple functioning space within a ‘prototypical’ generic space. This occurred within the large trading hall space in project one (Melbourne Grammar School), the collocation of amenities and common areas within the ‘snake’ of project two (Berwick) and the condensing of program types (for spatial expediency) in project three (UWS). In each instance the indeterminate was addressed by ‘engineering’ the given program rather than predicting any future programmatic needs. Program engineering by consolidating certain functions ie. circulation, amenities, computer labs, cafe, informal learning rooms, lounges etc, treats these spaces as public, and also as programmatic infrastructure. This is similar to the idea of the ‘stem’ or ‘web’ in Candilis, Josic, and Wood’s work or Louis Kahn’s ideas of servant space. The validity of these precedents in contemporary campuses is further expounded by the design work, where the served and servant space distinction is increasingly blurred.

An architectural language of change in the mat building type where the consideration (and selection) of architectural elements is infrastructural, ie. typical elements or repetitive structures, is evident at the Berlin Free University. Here, standardised elements were made operable for reorganising according to changing functional requirements. The infrastructure in the research projects, although not operable elements in a physical sense, are multi-functional zones with standardised formal qualities - Berwick snake, cone at MGS, or moving dome at UWS. The ‘infrastructural’ approach provides a prototypical form for the new presentation and combinations of multiple-program.

Coherence and open space

In each of the projects, the protection and delineation of open space is explored in various ways as a fundamental campus quality, found in numerous precedents discussed in this document. In each of the projects the use of open space is definitive in structuring the plan and maintaining an identity and coherence. It is a device that addresses legibility, connection and congruity for the campus.

Furthermore, the elucidation of an architecture that engages with the language of flux and the notion of both traversing (in the Peter Cook sense) and traversable architecture - Knights tour at Parramatta or allometric treatment of circulation at Melbourne Grammar School

Michael Bouteloup, Master of Architecture by research project - ADR
- are useful for the campus where the architectural experience and navigation of space can be amplified. Indeed it is the circulation space that is the enduring emblematic as the thoughtful perambulating space that began in the Oxbridge cloister.

**Tacit Urban Principle**

The thesis considers the notion of a ‘tacit urban principle’ as an other means of formal structuring within the indeterminacies of campus urbanism and invalidated (non) master plan’. The tacit urban principle (TUP) is understood as an inherent architectural topology made manifest on a site. The TUP, as a topology, is a rule or property (the study of limits) with a geometric outcome that structures the architectural response in a manner that is not purely functional - the bane of the master plan.

The projects demonstrate that architecture on campus may successfully engage with a latent architectural language, and that the construction and appropriation of such a language can also serve the identity of the campus (eg. the geometry of the oval or cricket pitch delineation at MGS and the picturesque or pitched roof pavilion at UWS). This method also provides an alternative limitation at an urban scale for each project, which is not as prohibitive as the envelope regime that often accompanies the master plan.

**Growth, applied systems and rules**

The projects seek to explore growth as an organisational and campus condition, this is explored with rule-based operations including cellular automata, packing optimisation, allometry, isotropic growth or the knight’s tour problem.

Inevitably, the deployment of such operations has the potential for a purely symbolic and applied architectural aesthetic – which is to be avoided. However, the use of such applied systems in program distribution, as used at Berwick, presents an emancipated view of the program problem/solution and further extends the modernist ‘science of programming’. This is worthy of further and continuing exploration to develop an integrated formal essence as a ‘theory of program’ particularly as new program types, education delivery and means of communication are rapidly evolving.

Similarly, the reconstitution of an architecture that is of pure problem solving that reaches the status of a ‘game’ (chess etc) is proposed as a valid way of objectifying the design process and engaging with the notion of the strategic and tactical.
The research work is unable to adequately prove the initial assertions of a demise of the master plan, (as this would require the test of some considerable time) also because each project’s response was limited to the brief provided. The projects became critical responses to the problematic of the master plan, that of its indeterminacy and capricious nature. The demise of the master plan remains as an observation that can only be considered in practice.

The design research attempts to expose the inherent problems of master planning by addressing it in reverse: ‘bottom-up’ instead of ‘top-down’ planning. It explores the possibility that an architectural substitute to the master plan exists, whereby individual buildings respond to a tacit macro-architectural language and other rules as architectural generators in lieu of a discrete envelope dictated by other factors.

The use of applied rule has a critical valency with the master plan, as it operates above a master plan, but can also co-incidentally engage and work within it. In many ways the master plan or the suggested architectural substitutes posited in these projects are constraints that are used as rules and a prerequisite for design operations in a campus context.

The rule is a pressure that is always limited by another rule. Rules do not make forms - the limitations that rules impose on one another do. (This phenomenon leads to what is known in computational science as “poisedness”).

Similarly, the contemporary campus is rarely the tabula rasa, it has pre-existing rules and orders (or master plan), tacit or explicit, against which other rules are applied reinforcing both the original and forging an original architectural outcome.

The projects and their devices are not intended as a rule book for deployment on various campuses. However the projects demonstrate that the objectification of design issues typically encountered on a campus, by rules and applied operations, is another means of engaging with the campus. They present a way to re-conceive of some of the essential elements of campus typology in the absence of traditional idealistic frameworks in the campus (Jeffersonian or otherwise).
Footnotes

1 Allen, S. Points + Lines: Diagrams and Projects for the City, Princeton Architectural Press, 1999 p17


5 The author has been employed at Architectus Melbourne between 2001-2004, Lyons 2005 and Paul Morgan Architects 2005-present. Campus projects that have been part of the work engaged during this timeframe (in varying capacities) include: (Architectus:) Sacred Heart Girls’ College, Oakleigh Masterplan, Library and Classrooms building; St Michael’s Grammar School, St Kilda, Masterplan, Stage 1 Classrooms building; Melbourne Grammar School Grimwade House, Caulfield, Grimwade Hall Auditorium Competition (2nd Place); Ringwood Secondary College, Ringwood (2005 RAIA award entry- shortlisted) Additions & Alterations; (Lyons:) Australian National University, John Curtin School of Medical Research; University of Western Sydney, Campbelfield, School of Medical Science; (Paul Morgan Architects:) RMIT University various B14 block, CGIT Leongatha Learning Centre, Leongatha; Chisholm Institute of TAFE, Dandenong, Automotive and Logistics Centre; School of Business, Dandenong; University of Melbourne, Centre for Neural Engineering.


9 Source: Dictionary.com Unabridged (v 1.1). Based on the Random House Unabridged Dictionary, Random House, Inc. 2006. In this thesis, any discussion of context refers to the discourse of the campus in lieu of physical context based relationship which is conditional on surrounding environment within which something occurs or responds to a background or setting.


11 Sorkin, M., Other Plans University of Chicago, Pamphlet Architecture 22 Princeton Architectural Press, 2001 p 27

12 Allen, S. Points + Lines: Diagrams and Projects for the City, Princeton Architectural Press, 1999 p93

13 Smithson, A., How to Recognise and Read Mat-Building, 1974 re-published in Sarks, H., Allard, H., and Hyde, T., Le Corbusier’s Venice Hospital and the Mat Building Revival Prestel Verlag, Munich 2001. pp91-92, the Smithson’s coined the phrase ‘mat building’ in this article.

ibid. p58

15 Sarks, H. The Paradoxical Promise of Flexibility in Sarks, H., Allard, H., and Hyde, T., Le Corbusier’s Venice Hospital and the Mat Building Revival Prestel Verlag, Munich 2001, p81-89. Sarks has suggested this was born in post World War II military downsizing and multi-purposing of facilities to reduce redundancies;


17 Ibid. p 145

18 Ibid. p 155


21 Ibid. p 2

22 Ley lines are hypothetical alignments of a number of places of geographical interest, such as ancient monuments and megaliths. Their existence was suggested in 1921 by the amateur archaeologist Alfred Watkins, whose book The Old Straight Track brought the alignments to the attention of the wider public.

23 Cooper, J. and Beck,H., Conversations with P Brew and M Markham in UME 05 The International Architecture Magazine, J Cooper and H Beck, Melbourne


26 Allen, S., Points + Lines: Diagrams and Projects for the City, Princeton Architectural Press, 1999 p48-57. see Chapter 2 Infrastructural Urbanism


28 Bernard Smith, Modernism’s History, Sydney: UNSW Press, 1998. Introduction, Smith considers Modernism as a period style and coins the term Formalesque. The late formalesque includes the op artists of the 1960’s and 70’s.

29 The genesis of Australian Football at Melbourne Grammar School c.1858 is contemporary with Rugby at Rugby School 1845, Squash at Harrow School 1860’s.

30 Thompson, D., and Bonner W.T., On growth and form, Cambridge University Press 1945


32 Excerpt from Chisholm Institute of TAFE Tender, Berwick Trade training Centre brief for principal consultants. Melbourne, April 2007.


35 Wolfram, S., A New Kind of Science, Wolfram Media 2002. Cellular Automata and the parallels with mechanisms of Nature are discussed in Chapter 2:


38 Vidler, A., Towards a Theory of the Architectural Program, October 106, MIT Press 2003 pp 59-74. Vidler urges architects to overcome program as the fatal modernist gap between form and function to include formal invention as part of an integral discourse.

**Selected Annotated Bibliography**

**Books**


This seminal text provides project based research that is presented as a manual with design tools for architecture and infrastructural urbanism which consider the indeterminate and temporal nature of the city.


A significant exegesis of a major site and culturally specific work in Santiago de Compostela; the notions of coding and index are discussed by Eisenman in this work.


Discourse on postwar American architecture as it evolved around the military industrial (academic) complex. The analysis considers a systems-based model of organization in architecture particularly in the work of Eero Saarinen and Skidmore, Owings and Merrill.


A thorough monograph of Eero Saarinen’s work.


A series of essays that analyse the emergence of mat buildings as a type and in particular explores Le Corbusier’s Venice Hospital proposal. The relationship of programming and architecture is also discussed along with Alison Smithson’s seminal essay on mat buildings.


De Certeau, a cultural theorist, discusses production and consumption in the context of dominant ‘strategic’ order versus a consumer’s ‘tactical’ appropriation of this order. He specifically addresses architectural space and the city in Part III: Spatial Practices. The notion of syntax as a spatial condition.


An accompaniment to an exhibition of the same name 2005-6 in various European cities, it chronologically documents all of the Team 10 meetings and projects presented at the meetings together with a series of essays. The issues of mat buildings, infrastructure, indeterminate programs and large scale projects are explored in some detail.

**Periodicals**


A critical review of Richard Serra’s work and discussion on the peripatetic viewpoint. As many original campuses were built in the picturesque traditional, the use of the constantly changing viewpoint is seen to be campus-like.


This paper reviewed the history of school building in Victoria and makes comparisons with the London Schools Board School type, the Queen Anne Stage set. The authors design work is discussed within this context of the asymmetrical ‘informal’ tradition.


Exploration of the architecture of change and indeterminacy in Tel Aviv.


An architectural history of Melbourne’s largest and most ambitious post war campus with critical insight into the political machinations of the campus.

Hamann, C. *Clyde Cameron College, in Kevin Borland, Architecture from the Heart*, Evans, D., Ed., RMIT University 2006

An essays on the imporatnce of the Clyde Cameron College project in the work of Borland, discussing the political context and references to the metabolists, James Stirling, megastructures and the episodic circulation experience.

This text provides seven different algorithmic techniques in architectural design, simply described in a series of steps, like recipes, complete with scripts available for download. Kwinter provides a thoughtful summation of the work and on rules and algorithms as they affect form. This text is important in the consideration of rules and principles in the design research.

An article discussing the mathematical organisation of architectural space in particular Wittkower’s analytical work on Palladian villas and their mathematical/spatial typology. Lynn posits his own speculative work in this tradition and considers various organic and ‘growth’ geometries.

Sorkin, M. , Other Plans University of Chicago, Pamphlet Architecture 22 Princeton Architectural Press, 2001
An exegesis of unsolicited design work for this significant American campus, Sorkin addresses the conundrum of “how far to go” in a master plan, he laments the “provisional ... absent architecture” of the selected master plan. Sorkin’s design research addresses issues of campus history, future growth and the existing program, culture and architectural qualities of the campus that inform the proposal.


Vidler, A., Toward a Theory of the Architectural Program, October 106, MIT Press, Fall 2003, pp. 59-74
Vidler urges architects to overcome program as the ‘fatal modernist gap between form and function’ to include formal invention as part of an integral discourse.