Edmondson Park South
Sewer Options Report

Prepared for:

Sydney Water Corporation

September, 2010

Prepared by:

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Edmondson Park South
Sewer Options Report

- DOCUMENT CONTROL SHEET -

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A	Draft	LP (22/10/10)	GM (22/10/10)	Initials (Date)
B	First Issue	LP (16/11/10)	GM (16/11/10)	Initials (Date)
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D		Initials (Date)	Initials (Date)	Initials (Date)

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Edmondson Park South
Sewer Options Report

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1 EXECUTIVE SUMMARY

Landcom is proposing to deliver a new diverse and sustainable urban community at Edmondson Park South. Once complete, Edmondson Park South will accommodate a mix of land uses, a diversity of housing (approximately 3,200 dwellings), a new town centre incorporating 35,000 – 45,000m2 retail, business and commercial floor space with employment opportunities for 1,000 people. Multi-purpose community and education facilities, a new 150 hectare Regional Park, a number of other local parks and environmental conservation areas.

As part of all land development within the Greater Sydney area it is a fundamental element of that process that the developer will need to ensure that adequate sewer infrastructure is available to service every proposed new property to the requirements of Sydney Water. Investigations to date have found that Sydney Water has commenced the application process to secure planning approval under Part 5 of the Act to sewer the Edmondson Park South Release Area. The current application includes the construction of a sewer pumping station (SPS) and associated pressure main as a means to crossing the proposed Conservation Lands corridor. The reason for this proposed SPS option was based on Department of Environment, Climate Change and Water's (DECCW) non concurrence to a sewer main within the proposed conservation lands.

Landcom has made representations to Sydney Water which seek agreement to the adoption of an alternative sewering strategy which negates the expensive and time consuming delivery of a SPS. Arising from those representations Sydney Water has agreed in principle to a gravity sewer alternative subject to:

- Addressing Sydney Water's design criteria
- Servicing all of Ingleburn Gardens
- Securing the concurrence of DECCW
- Securing alternative planning approval under Part 3A

Having had it demonstrated that those conditions can be met, Sydney Water has agreed to streamline the processes for adopting an alternative gravity strategy by receiving and considering a Sewer Options Report which can demonstrate that the benefits of the Landcom proposed gravity sewer option significantly outweigh those for the SPS Option. In this regard J Wyndham Prince has prepared this report.

The two options are clearly defined by the difference in costs to construct, design, operate, maintain and acquire lands. In this regard the cost to bypass the Conservation Lands by means of a pumping station system exceeds the cost to cross the same land by gravity (Options 1 – NPV Cost $4,715,000 Option 2 – NPV Cost $2,080,167 – See NPV Table Page 20).

From all of the information provided in this report it has been demonstrated that the gravity sewer option clearly offers a more positive outcome for the delivery of sewer infrastructure servicing for Edmondson Park South. When considering the economic, environment, social and time impacts of the gravity sewer option in comparison to the SPS option, the gravity sewer is the recommended preferred option.

2 INTRODUCTION

This Sewer Options Report has been prepared by J Wyndham Prince for and on behalf of Landcom at the request of Sydney Water to investigate, discuss and compare the two distinct options for sewer infrastructure to service the Edmondson Park South Release Area. Those options being:

- Sewer Pumping Station and pressure main to bypass the Regional Park Conservation Lands
- Gravity sewer main to cross the Regional Park Conservation Lands

The aim of this report will be to briefly describe the project, the background and compare the two options by addressing costs and the various advantages and disadvantages of each. Following this comparison it is intended to determine the preferred option and make appropriated recommendations to Sydney Water accordingly.

3 THE SITE

The subject site comprises an area of approximately 413.3 hectares and forms part of the larger Edmondson Park Release Area within the South West Growth Centre. It is located to the north-west of the M5 Motorway and lies approximately 40 km to the south west of Sydney CBD. Approximately 260.4 hectares of the site is located within the Liverpool LGA and approximately 152.9 hectares is located within the Campbelltown LGA. Refer to Location Plan at Figure 1.

The majority of the site is currently owned by the Commonwealth (Department of Defence) and was formerly used as an army camp (the Ingleburn Army Camp) up until the 1990s when it was identified as surplus to Defence requirements. Since this time it has been progressively vacated. The project is intended to be carried out once ownership or control of the former Ingleburn Army Camp land has passed to the State. Other land within the site is owned by Landcom, the Minister Administering the EP&A Act, the Minister for Education, Training and Youth Affairs, the RTA, along with several roads owned by Liverpool City Council and Campbelltown City Council.

The site is largely vacant. Remnants of military facilities (i.e. cottages, former building slabs, internal roads, training facilities etc) associated with the site's former Defence use are scattered through-out the site. There are a number of cottages / houses previously used by Defence personnel in an area of the site generally referred to as "Ingleburn and Bardia Villages". The Ingleburn North Public School (1.835 hectares) is located on the southern and the Bambi Preschool on the northern side of Campbelltown Road.

The site is undulating to steep. It slopes from its highest point (80 m AHD) at the intersection of Zouch and Campbelltown Roads to its lowest point (40 m AHD) at its eastern corner and to a similar elevation adjacent to the M5 Motorway in the south-west corner. The central portion of the site along Campbelltown Road forms a ridge with gentle falls to the north and south.

The condition of existing vegetation on the site varies from exotic pasture with negligible ecological value to areas of good condition vegetation with high recovery potential. The existing cleared portions of the site generally contain non native species.

The site is at the top of three catchments. Maxwell Creek, Bunbury Curran Creek and Cabramatta Creek pass through the site, with associated riparian zones and some woodland habitat (notably Cumberland Plain.

4 THE PROPOSAL

4.1 CONCEPT PLAN

The Concept Plan establishes the overall planning framework for the site, including:

- land use type and distribution
- a mix of housing types and densities (approximately 3,200 dwellings)
- concept location of and approximately 35,000 – 45,000 m2 of retail / commercial floor space within the new Edmondson Park Town Centre
- identification and location of open space and drainage corridors, environmental conservation lands (to form the new Regional Park), and local active and passive recreation facilities, including levels of embellishment
- road network layout
- pedestrian and cycleway network layout
- pedestrian bridge over the south western railway
- Campbelltown Road corridor including the establishment of key intersection locations and configuration
- utilities (including power, telecommunications and gas), infrastructure strategy, potable water strategy, sewer concept plan and water cycle management plan
- location and dimensions of Bushfire Asset Protection Zones
- appropriate interpretation of European and Aboriginal heritage located on the site
- erection of signage and billboards
- remediation works
- demolition

The Concept Plan also sets out an approval framework that will enable the carrying out of the works necessary to remediate the site in accordance with a Remediation Strategy without the need for undertaking further environmental assessment.

A variety of housing types is proposed to be delivered. This will provide for a range of housing price points and will include moderate income housing and housing for seniors.

It is proposed to develop the Edmondson Park site progressively in stages over a 15-20 year period. The Concept Plan will address the staging and delivery of the overall development having regard to the progressive delivery of necessary infrastructure, services and facilities; and market demand.

The Concept Plan is accompanied by a proposal with respect to the future developer contributions framework for the provision of local facilities and services within the Liverpool and Campbelltown LGAs as well as State Infrastructure.

4.2 PROJECT APPLICATION

The residential subdivision Project Application comprises:

- the creation of 206 residential lots, 8 super lots for future subdivision 15 Environmental Living lots and 3 lots for dedication to Campbelltown City Council as Public Reserve in 5 stages1
- the dedication of roads to Campbelltown City Council
- on-site works comprising
    - tree removal
    - earthworks including excavation, cut and fill
    - design and construction of physical infrastructure, including roads, stormwater drainage and utility reticulation, traffic management works, establishment of open space areas
    - retaining walls as determined during detailed design
    - design and construction of staged stormwater water quantity and quality infrastructure to achieve objectives required by the Water Cycle Management (WCM) strategy for the greater site
    - demolition of all existing structures
    - erosion and sediment control to areas of roadworks and bulk earthworks including provision of temporary sedimentation ponds and diversion drains
    - design and construction of an ornamental pond
    - landscaping of road reservations
    - erection of signage and billboards; and
    - embellishment of open space

- Off-site works comprising:
    - construction of the sewer lead in from the Sydney Water carrier main at Ash Road
    - upgrade of overhead mains and construction of electrical lead-in feeders from the existing zone substation at Prestons
    - connection to utility services, potable and recycled water, electricity, gas and telecommunications in Campbelltown and MacDonald Roads
    - Connection to existing stormwater drainage
    - tree removal
    - earthworks including excavation, cut and fill
    - design and construction of physical infrastructure, including roads, stormwater drainage and utility reticulation, traffic management works, including the connection to the existing MacDonald Road
    - design and construction of staged stormwater water quantity and quality infrastructure to achieve objectives required by the Water Cycle Management (WCM) strategy for the greater site
    - erection of an acoustic wall
    - erection of signage and billboards
    - extension or relocation of existing services including potable and recycled water, gas, telecommunication, power
    - demolition of all existing structures; and
    - Proposed new intersection to existing Macdonald Road

It is intended to seek staged Construction Certificates as necessary to facilitate the efficient delivery of each phase of, the development works.

The first stage residential Project Application will include the proposed construction of a gravity sewer line through the future Regional Park.

NOTE: In order to undertake the subdivision described in the Stage 1 Project Application above it will be necessary to ensure that each of the 206 proposed new residential lots is connected to existing Sydney Water Sewer Infrastructure. In this regard Landcom's Part 3A Application includes off site works comprising the construction of the sewer lead in main from the Sydney Water carrier main at Ash Road through to the proposed sewer reticulation mains within the Stage 1 site.

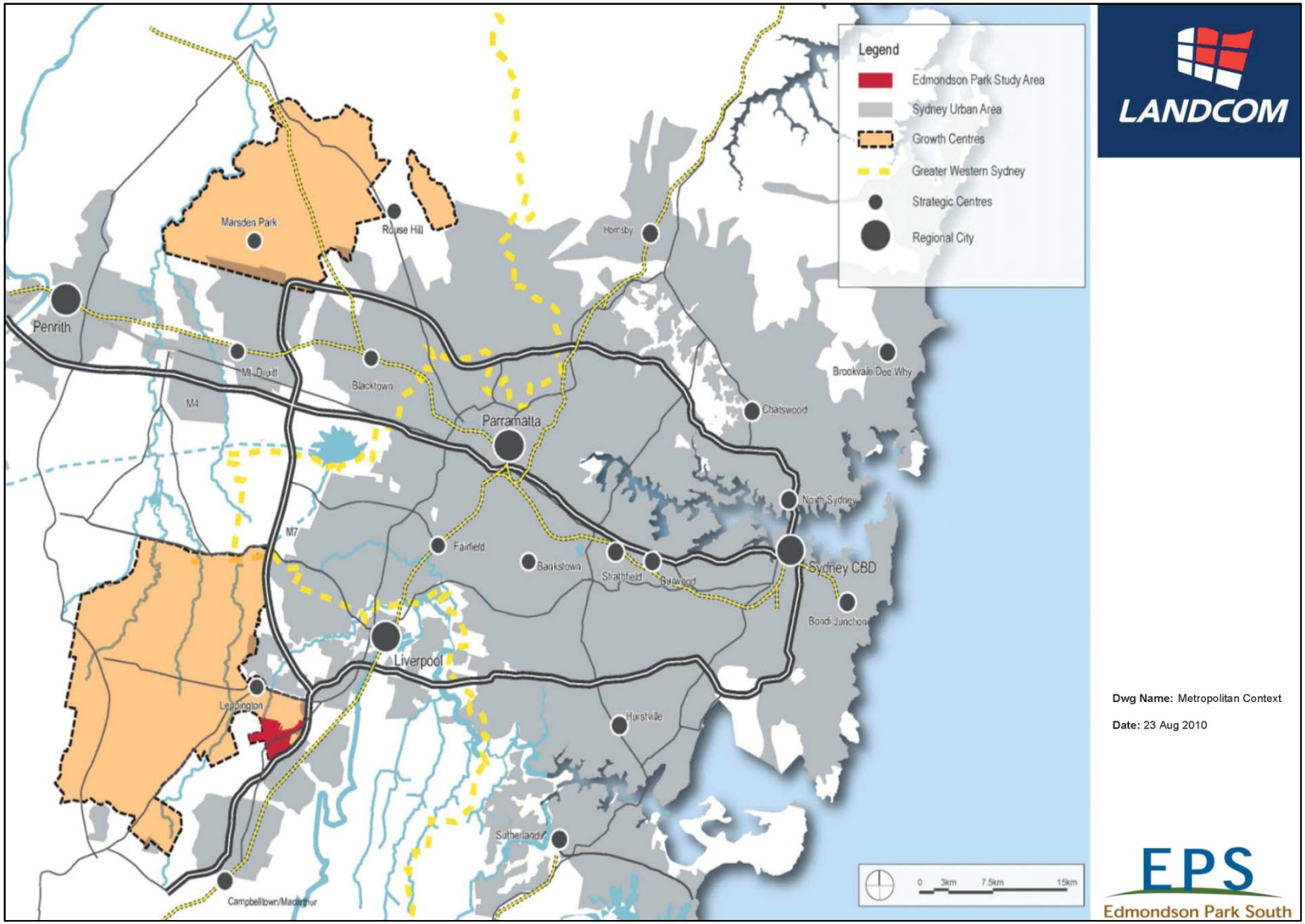
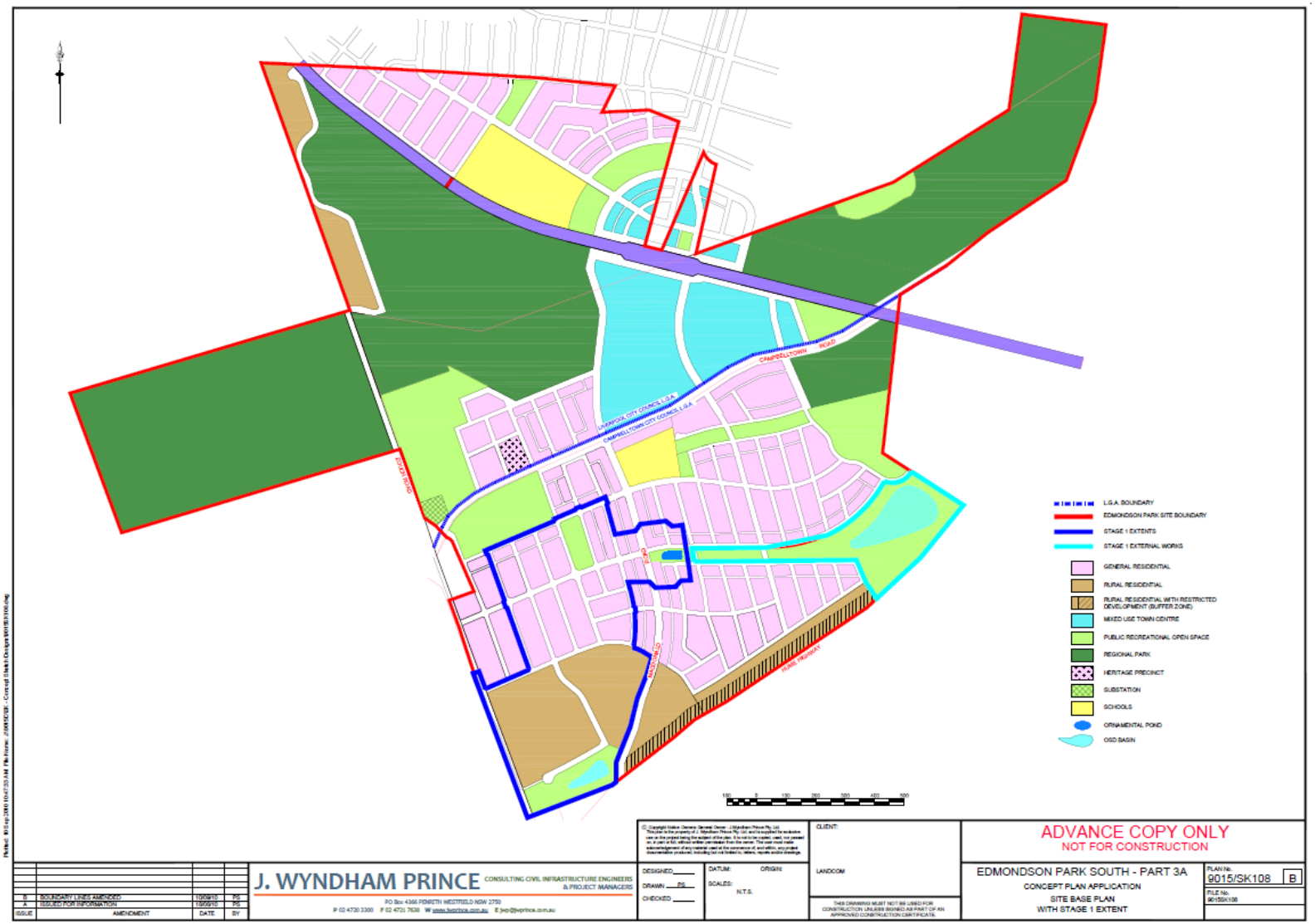

Legend
Edmondson Park Study Area
Sydney Urban Area
Growth Centres
Greater Western Sydney
Strategic Centres
Regional City
LANDCOM
Marsden Park
Rouse Hill
Hornsby
Penrith
Mt Druitt
Blacktown
M4
Parramatta
Brookvale/Dee Why
Chatswood
North Sydney
M7
Fairfield
Bankstown
Strathfield
Burwood
Sydney CBD
Bondi Junction
Liverpool
Leppington
Hurstville
Sutherland
Campbelltown/Macarthur
0 3km 7.5km 15km
Dwg Name: Metropolitan Context
Date: 23 Aug 2010
EPS
Edmondson Park South

Figure 1


L.G.A. BOUNDARY
EDMONDSON PARK SITE BOUNDARY
STAGE 1 EXTENTS
STAGE 1 EXTERNAL WORKS
GENERAL RESIDENTIAL
RURAL RESIDENTIAL
RURAL RESIDENTIAL WITH RESTRICTED DEVELOPMENT (BUFFER ZONE)
MIXED USE TOWN CENTRE
PUBLIC RECREATIONAL OPEN SPACE
REGIONAL PARK
HERITAGE PRECINCT
SUBSTATION
SCHOOLS
ORNAMENTAL POND
OSD BASIN
CAMPBELLTOWN ROAD
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EDMONDSON PARK SOUTH - PART 3A
CONCEPT PLAN APPLICATION
SITE BASE PLAN
WITH STAGE 1 EXTENT
9015/SK108
B

Figure 2

5 BACKGROUND

5.1 Planning Background

The Edmondson Park Release Area, including the site, has been the subject of broad strategic planning investigation and environmental assessment over a number of years by Liverpool and Campbelltown City Councils, the Department of Planning, the Department of Defence (the current landowner of the Ingleburn Army Camp) and Landcom (owner of certain lands).

The whole of the Edmondson Park Release Area has been released for urban development by the Minister for Planning. Part of the site; the Ingleburn Army Camp, is currently the subject of a delayed' rezoning for urban purposes under Liverpool Local Environmental Plan 2008 and Campbelltown (Urban Area) Local Environmental Plan 2002.

In June 2010 the Minister for Planning considered a Preliminary Assessment Report for the Edmondson Park South Project that provided justification for the planning, assessment and delivery of the project to occur under Part 3A of the EP&A Act, having regard to the demonstrated contribution that the project will have to achieving State and regional planning objectives.

Subsequently, on 23 July 2010, pursuant to Clause 6 of SEPP Major Development, the Minister for Planning formed the opinion that the Edmondson Park Project constitutes a Major Project to be assessed and determined under Part 3A of the EP&A Act, and also authorised the submission of a Concept Plan for the site. In doing so, the Minister also formed the opinion that a State Significant Site (SSS) study be undertaken to determine whether to list the site as a State Significant Site in Schedule 3 of SEPP Major Development.

The Part 3A process under the EP&A Act allows for the Edmondson Park South Project to be planned, assessed and delivered in a holistic manner, with a uniform set of planning provisions and determination by a single consent authority. Given the scale of the proposal, the Concept Plan and SSS listing provide the opportunity to identify and resolve key issues such as land use and urban form, development staging, infrastructure delivery and environmental management in an integrated and timely manner.

5.2 Sewer Infrastructure Background

During the process of proposing and lodging its Part 3A Application Landcom undertook extensive discussions with Sydney Water as to the nature and extent of existing and proposed water and sewer infrastructure. Arising from these discussions it became evident that Sydney Water is currently in the process of securing a Part 5 approval for the sewer infrastructure which will service these areas described as catchment E and F within the Edmondson Park South Release Areas.

As part of Sydney Water's sewer infrastructure strategy to service these catchments they are proposing to bypass the Maxwell's Creek corridor Conservation Lands by means of a proposed new SPS and pressure main system. This SPS will collect gravity sewer from the catchment upstream (to the south) of this area and pump it around the western end of the corridor and then discharge into the proposed gravity carrier main on the northern edge of the corridor. This main follows the corridor to the north to connect to the existing carrier main at Ash Road. This system is described in more detail below and is shown on Figure 3.

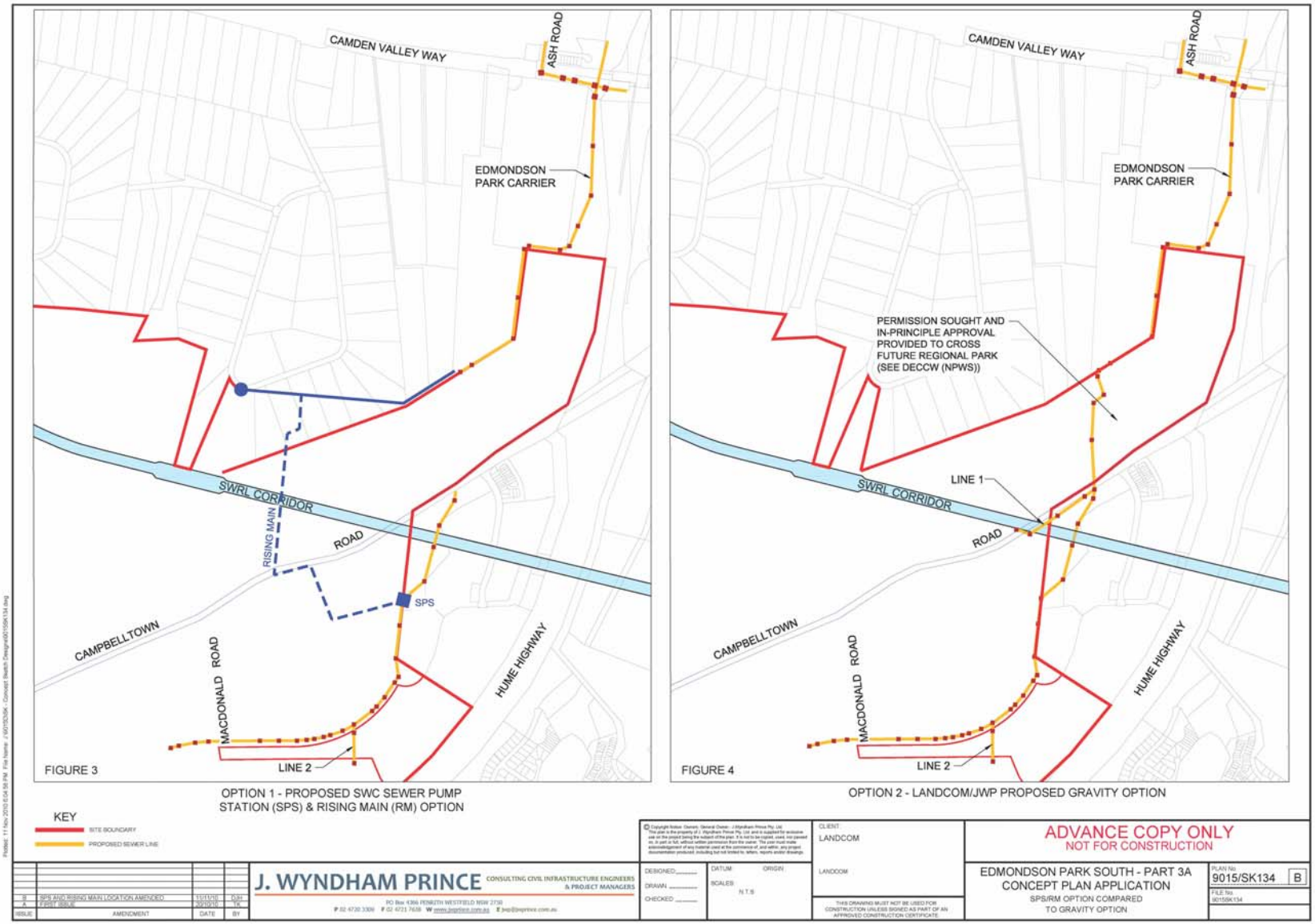
It is understood that Sydney Water's decision to adopt the SPS strategy option was founded on the input from DECCW who would become the owners of the Conservation Lands corridor. That input was that under no circumstances would they agree to the sewer traversing the conservation lands.

Following strong representations from Landcom that unwarranted cost and time impacts associated with the SPS option would be incurred, Sydney Water agreed in principle to a gravity main option to traverse these lands on condition of the following:

1. all Sydney Waters design criteria for leak tight sewer were addressed
2. all of the lands within Ingleburn Gardens Estate could be serviced by gravity sewer
3. the written concurrence of DECCW was secured with regard to the sewer within the Conservation Lands
4. Landcom securing alternative planning approval for the gravity main option as part of its Part 3A application

J Wyndham Prince and Landcom have progressed the design negotiations with the aim of addressing these criteria. In this regard items 3 and 4 have been secured. J Wyndham Prince and Qalchek on behalf of Landcom has prepared and presented preliminary sewer main designs to Sydney Water which indicate that items 1 and 2 above are feasible and can be addressed.

Sydney Water has stated that in order to streamline the approval process it will consider formally adopting the gravity sewer main option, subject to J Wyndham Prince preparing and submitting this Options Report.


CAMDEN VALLEY WAY
ASH ROAD
EDMONDSON PARK CARRIER
SWRL CORRIDOR
RISING MAIN
ROAD
SPS
CAMPBELLTOWN
MACDONALD ROAD
HUME HIGHWAY
LINE 2
FIGURE 3
OPTION 1 - PROPOSED SWC SEWER PUMP STATION (SPS) & RISING MAIN (RM) OPTION
PERMISSION SOUGHT AND IN-PRINCIPLE APPROVAL PROVIDED TO CROSS FUTURE REGIONAL PARK (SEE DECCW (NPWS))
LINE 1
FIGURE 4
OPTION 2 - LANDCOM/JWP PROPOSED GRAVITY OPTION
KEY
SITE BOUNDARY
PROPOSED SEWER LINE
J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS & PROJECT MANAGERS
CLIENT: LANDCOM
ADVANCE COPY ONLY
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EDMONDSON PARK SOUTH - PART 3A
CONCEPT PLAN APPLICATION
SPS/RM OPTION COMPARED TO GRAVITY OPTION
PLAN No. 9015/SK134 B

Figure 3 & 4

6 SCOPE OF SEWER OPTIONS REPORT

With the aim of providing sufficient information to Sydney Water which would allow them to assess the various advantages and disadvantages of their existing SPS option compared against Landcom's proposed gravity sewer option this report will address the following scope of works for each of these options.

- Description
- Economic impacts (costs)
- Environmental impacts
- Social impacts
- Time constraints
- Comparison
- Conclusion and recommendation

It should be noted that the information offered in addressing these options has been derived from J Wyndham Prince's experience with other similar projects, input from Sydney Water and from liaison with established industry contractors.

6.1 Option 1 – Sewer Pumping Station

6.1.1 Description

The existing Sydney Water option to sewer catchments E and F of Edmondson Park South consists of the following components of infrastructure.

- Conventional gravity sewer reticulation and carrier mains collecting sewer from the proposed development including Ingleburn Gardens which discharge to a sewer pumping station adjoining the Ingleburn Gardens Estate
- Construction of a Sewer Pumping Station on the south side of the Conservation Lands corridor and adjoining Ingleburn Gardens. This SPS will allow for
    - Servicing approximately 2000 dwellings
    - Storage capacity 600m^3
    - 2 x 20kw pumps
    - 7m depth
- 985m of pressure sewer main which will be constructed up along the southern edge of the Conservation Lands and across the head of the corridor and then discharge into the gravity carrier main on the northern side of the Conservation Lands opposite the SPS
- Construction of 1800m of gravity sewer carrier main from the point of discharge of the pressure main down along the northern edge of the Conservation Lands to discharge into the existing sewer carrier main at Ash Road

For details of Option 1 SPS and pressure main see attached Figure 3.

6.1.2 Economic Impacts

For the purpose of comparing the economic impact it has been assumed that both options include the same upstream leak tight sewer collection network and the same downstream leak tight sewer carrier main. The primary difference for comparison purposes will be the SPS and pressure main

option to bypass the Conservations Lands versus the gravity main crossing option. In this regard we address the SPS and pressure main cost impacts.

OPTION 1	
Land Acquisition	
Pre-Construction • Design Costs (based on 4% of construction cost – SPS and Rising Main) • Project Management & Superintendency (based on 6% of construction cost – SPS & Rising Main)	
Construction Costs • Based on 85% of construction costs of Turner Road SPS – approx $3M (with PVC liner to pump well & holding tank instead of epoxy (plus $0.5M))	
Ongoing Operational & Maintenance Costs • Sewer Pump Station o Based on 4% of construction costs and assumed 5% inflation • Rising Main o Based on 3% of construction costs and assumed 5% inflation	
Option 1 Total Cost Impact - Based on NPV calculation (see table page 20)	**$4,715,800.00**

Note: the above costs have been derived from

- Construction costs – other similar projects (Elderslie, Turner Road)
- Design costs – Industry standards
- Operation and Maintenance – as advised by Sydney Water
- Time – Developer Costs – estimate as provided by Landcom

6.1.3 Environmental Impacts

The following environmental impacts are offered for consideration in association with the option of constructing a SPS to service Edmondson Park South.

Construction

- Site disturbance due to larger footprint of works and site amenities
- Longer duration for construction will result in additional energy consumption
- Additional consumption of non renewable resources in construction materials

Post Construction

- SPS in close proximity to Maxwell's Creek offers a higher risk of pollution due to overflow
- Ongoing operation and maintenance will result in ongoing consumption of energy and CO^2 atmospheric impact

6.1.4 Social Impacts

- The above adverse environmental impacts will consequently result in social impacts
- The presence of an ongoing, operation SPS in close proximity to Ingleburn Gardens and the adjoining Conservation Lands will result in adverse amenity social impacts
- The increased costs in construction and ongoing operations of a SPS will have a flow on impact on development costs thus on affordability of residential lands

6.1.5 Time Impacts

Recent experiences with Sydney Water's Complex Works programme to design, construct and handover a sewer pumping station could see the duration of this process being 2 years. This experience is demonstrated by both Elderslie and Turner Road SPS projects.

From the Economic Impacts above it can be seen that the developer costs associated with time delays are significant and very real. Other impacts arising from this time difference are:

- Deferral of delivery of housing supply
- Impact on Sydney Water staff resources

6.2 Option 2 – Leak Tight Gravity Sewer Carrier Main

6.2.1 Description

The proposed Landcom preferred option to sewer catchments E and F by means of gravity mains consists of the following components of infrastructure.

- Leak tight sewer reticulation and carrier mains to collect effluent from the proposed development including Ingleburn Gardens
- From the point of confluence of Edmondson Park South and Ingleburn Gardens (site of optional SPS) Option 2 proposed to immediately cross the Conservation Lands corridor by means of a continuation of leak tight sewer carrier main to connect and discharge into the proposed leak tight carrier main on the northern edge of the Conservation Lands.

  Note: the route of this proposed crossing has been determined and pegged in consultation with representatives of DECCW with the aim of minimising site disturbance and impact on vegetation. Thus DECCW has given its concurrence to this proposed crossing.
- Construction of 1800m of leak tight sewer corridor amen form this point of connection along the northern edge of the Conservation Lands to discharge into the existing sewer carrier main at Ash Road.
- For details of the proposed gravity sewer main Option 2 please see attached Figure 4.

6.2.2 Economic Impacts

For the purpose of comparing the economic impact it has been assumed that both options include the same upstream leak tight sewer collection network and the same downstream leak tight sewer

carrier main. The primary difference for comparison purposes will be the SPS and pressure main option to cross the Conservations Lands versus the gravity main crossing option. In this regard we address the gravity sewer main cost impacts only.

OPTION 2	
Land Acquisition	
Pre-Construction • Design Costs (based on 4% of construction cost – SPS and Rising Main) • Project Management & Superintendency (based on 6% of construction cost – SPS & Rising Main)	
Construction Costs	
Ongoing Operational & Maintenance Costs • Gravity Carrier o Based on 1% of construction costs SPS & RM and assumed 5% inflation	
Option 2 Total Cost Impact - Based on NPV calculation (see table page 20)	**$2,080,167.00**

6.2.3 Environmental Impacts

The following environmental impacts are offered for consideration in association with the option of constructing a gravity sewer main across the Conservation Lands to service Edmondson Park South.

Construction

- There will be site disturbance and vegetation removal during construction due to the need to excavate the gravity sewer through bushland. This impact will be minimised in that the route has been agreed onsite with DECCW and will be aligned mostly with existing and future access tracks.
- Due to reduced duration of construction and lesser construction materials the demand on non-renewable resources and CO^2 emissions will be limited.

Post Construction

- There will be no demand on energy and CO^2 emissions arising from ongoing operations

- Due to the leak tight design and construction of the gravity main the risk of effluent overflow into adjoining Maxwell's Creek will be minimal

Social Impacts

- Due to a reduction in Environmental Impacts the associated social impacts are reduced as well
- There will be no obvious presence of sewer infrastructure in close proximity to residential or open space areas
- The reduction in construction and maintenance costs will be reflected in overall development costs which are in turn reflected in housing affordability

Time Impacts

- The design, construction and handover timeframes for a gravity sewer, although also complex works, can be delivered within six months. Thus there will be no adverse time impacts which can not be accommodated within the programme of the delivery of Landcom's Stage 1 Development.
- The time impacts are positive:
    - Earlier delivery of housing supply
    - Reduced demand in Sydney Water Staff Resources

7 COMPARISON OF OPTIONS

The above information on each option can be summarised and compared against the other as seen below.

CRITERIA	OPTION 1 SPS and Pressure Main			OPTION 2 Consultancy Sewer Main
SWC Design Compliance	SPS allows for improved grades and thus lessen depth of excavation	✓		Gravity Option necessitates have minimum grades thus greater depths
Servicing of Ingleburn Gardens	Does service all of Ingleburn Gardens	✓	✓	Does service all of Ingleburn Gardens
Concurrence of DECCW	Avoids impacts on DECCW	✓	✓	DECCW concurrence available
Planning Approval	SWC pursuing Part 5	✓	✓	Landcom pursuing Part 3A
NPV Costs	SPS Option Total Cost $4,715,000 + Time Costs		✓	Gravity Sewer Main Total Cost $2,080,167
Environmental Impacts	SPS offers slightly less short term but significantly greater long term impacts			Gravity Main offers some vegetation removal agreed to by DECCW but has minimal long term impacts
Social Impacts	Significant amenity impacts of SPS in close proximity to residential and open space. Negative impacts on housing affordability		✓	No amenity impacts on adjoining residential and open space. Positive impacts on housing affordability
Time Impacts	Delivery of SPS may take 2 years with adverse cost, housing supply and staff resourcing impacts		✓	Gravity main can be delivered with 6 months in accordance with Landcom Stage 1 programme. Positive impact on cost, housing supply and staff resources
Verdict			✓	

7.1 Cost Comparison

The two options are most clearly defined by the difference in the cost to construct, operate and maintain. These are shown in NPV results attached.

Element	Option 1 – SPS & Pressure Main	Option 2 - Gravity Main
Land Acquisition Costs	Refer attached spreadsheet	Refer attached spreadsheet
Pre-Construction	Refer attached spreadsheet	Refer attached spreadsheet
Construction	Refer attached spreadsheet	Refer attached spreadsheet
Ongoing Operational & Maintenance	Refer attached spreadsheet	Refer attached spreadsheet
Total	**$4,715,800**	**$2,080,167**

8 CONCLUSIONS AND RECOMMENDATIONS

From the above information and comparisons it can be clearly seen that the advantages of a gravity sewer main crossing of the Conservation Lands far outweigh the existing option of constructing a SPS and pressure main.

In light of the fact that the only reason for adopting a SPS option was to avoid any conflict with DECCW as to concurrence of a sewer crossing within the Conservation Lands it would seem that this option is no longer relevant.

Landcom's has been able to secure the written concurrence of DECCW to the gravity crossing. By way of preliminary design Landcom has been able to demonstrate the gravity option will address Sydney Water's design and servicing criteria.

Having considered all of the infrastructure provided above and the conclusions which are evident, recommends that they gravity sewer main option be adopted as the preferred servicing option.
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9 ATTACHMENT – NPV ANALYSIS

Edmondson Park South - NPV Analysis

J. Wyndham Prince Pty Ltd
DRAFT for SWC Review
AF 08/11/10 9015

Option 1		Var 1	Var 2	Var 3	Total	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Land Acquisition	Based on developable land from CCC via Landcom at $1.2M /Ha, 25m x 25m footprint	25	25	1,200,000	75,000	$ 75,000																				
Pre - Construction																										
Design Costs	Based on 4% of construction cost - SPS & RM	1	0.04	2,979,225	119169	$ 39,723	$ 39,723	$ 39,723																		
Project Management & Superintendency Costs	Based on 6% of construction cost - SPS & RM	1	0.06	2,979,225	178754	$ 59,585	$ 59,585	$ 59,585																		
Construction Costs																										
Sewer Pump Station	85 % of $3M for Turner Rd (with pvc liner to pump well & holding tank instead of epoxy (plus $0.5M)).	1	1	2600000	2600000		$ 1,820,000	$ 780,000																		
Sewer Rising Main	985 at $385 per lin.m	1	985	385	379225			$ 379,225																		
Sewer Gravity carrier main from Vartuli property entry point to Ash Rd carrier connection point		Not calculated as same as Alternative Option 2																								
Sewer Gravity carrier main from Town Centre north to Vartuli property entry point		Not calculated as same as Alternative Option 2 but likely to be larger pipe size than Option 2 - see Option 2.																								
Ongoing Operational & Maintenance Costs																										
Sewer Pump Station (5% Inflation assumed)	Based on 4% of construction cost - SPS & RM	1	0.04	2,600,000	104000				$ 104,000	$ 109,200	$ 114,660	$ 120,393	$ 126,413	$ 132,734	$ 139,371	$ 146,340	$ 153,657	$ 161,340	$ 169,407	$ 177,878	$ 186,772	$ 196,111	$ 205,917	$ 216,213	$ 227,024	$ 238,376
Rising Main (5% Inflation assumed)	Based on 3% of construction cost - SPS & RM	1	0.03	379,225	11377				$ 11,377	$ 11,946	$ 12,544	$ 13,172	$ 13,831	$ 14,523	$ 15,250	$ 16,013	$ 16,814	$ 17,655	$ 18,538	$ 19,465	$ 20,439	$ 21,461	$ 22,535	$ 23,662	$ 24,846	$ 26,089
					Sub Total	$ 174,308	$ 1,919,308	$ 1,258,533	$ 115,377	$ 121,146	$ 127,204	$ 133,565	$ 140,244	$ 147,257	$ 154,621	$ 162,353	$ 170,471	$ 178,995	$ 187,945	$ 197,343	$ 207,211	$ 217,572	$ 228,452	$ 239,875	$ 251,870	$ 264,465
		NPV based on discount rate of			0.06	$ 174,308	$ 1,810,668	$ 1,120,090	$ 96,873	$ 95,959	$ 95,054	$ 94,158	$ 93,270	$ 92,391	$ 91,520	$ 90,657	$ 89,802	$ 88,955	$ 88,116	$ 87,285	$ 86,462	$ 85,646	$ 84,839	$ 84,039	$ 83,246	$ 82,461
		Option 1 Total				$		4,715,800																		

Option 2		Var 1	Var 2	Var 3	Total	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Land Acquisition		No land acquistion required, as crossing land which the sewer garivty carrier will service.																								
Pre - Construction																										
Design Costs	Based on 4% of construction cost - SPS & RM	1	0.04	1,634,400	65376	$ 65,376																				
Project Management & Superintendency Costs	Based on 6% of construction cost - SPS & RM	1	0.06	1,634,400	98064	$ 98,064																				
Construction Costs																										
Sewer Gravity carrier main from EPS exit point to Vartuli property entry point	908m of PE "Leak Tight" 450mm dia at $1800/lin.m	1	908	1800	1634400	$ 1,634,400																				
Sewer Gravity carrier main from Vartuli property entry point to Ash Rd carrier connection point		Not calculated as same as Alternative Option 1																								
Sewer Gravity carrier main from Town Centre north to Vartuli property entry point		Not calculated as same as Alternative Option 1 but likely to be smaller pipe size than Option 1 as area between TC & Campbelltown Rd draining via Ingleburn Gardens & regional park (ie. conservative cost comparison in favour of Option 1)																								
Ongoing Operational & Maintenance Costs																										
Gravity carrier (5% Inflation assumed)	Based on 1% of construction cost - SPS & RM	1	0.01	1634400	16344		$ 16,344	$ 17,162	$ 18,021	$ 18,923	$ 19,870	$ 20,864	$ 21,908	$ 23,004	$ 24,155	$ 25,363	$ 26,632	$ 27,964	$ 29,363	$ 30,832	$ 32,374	$ 33,993	$ 35,693	$ 37,478	$ 39,352	$ 41,320
					Sub Total	$ 1,797,840	$ 16,344	$ 17,162	$ 18,021	$ 18,923	$ 19,870	$ 20,864	$ 21,908	$ 23,004	$ 24,155	$ 25,363	$ 26,632	$ 27,964	$ 29,363	$ 30,832	$ 32,374	$ 33,993	$ 35,693	$ 37,478	$ 39,352	$ 41,320
		NPV based on discount rate of			0.06	$ 1,797,840	$ 15,419	$ 15,274	$ 15,131	$ 14,989	$ 14,848	$ 14,708	$ 14,570	$ 14,433	$ 14,297	$ 14,163	$ 14,029	$ 13,897	$ 13,767	$ 13,637	$ 13,509	$ 13,381	$ 13,255	$ 13,130	$ 13,006	$ 12,884
		Option 2 Total				$		2,080,167																		