Greenfield and infill developments in the ACT Comparative cost study
Comment register

Version Final draft - C
Date 24/10/2018

Comment no.	EPSDD Comment	AECOM response	Open/Closed
1	The Executive Summary notes that *"...much of the cost of these two greenfield sites is driven by the provision of new schools to service the expansion ..."* Although the provided urban infill sites (in the report) do not require the provision of schools. It would however benefit from an exclaimer in the Executive Summary that notes there will be a need for education to augment infrastructure to meet a growing population in urban areas.	Additional commentary on education services in existing urban areas added to Executive Summary	Closed
2	The executive Summary notes in terms of urban planning "…the cost of infill developments is markedly lower… …due to already serviced infrastructure… …require much lower forms of social infrastructure…" we have had feedback that we need to state this is based on a small sample size further information on capacity provisions (and cost to upgrade infrastructure) should be incorporated in the discussion (this is further analysed in the body of the report).	Quanifying commentary added to Executive Summary	Closed
3	The executive Summary notes in terms of urban planning "…the costs per dwelling do not consistently decline as the size of development increases…" and "…The greenfield developments exhibit declining unit costs as their size increases…" It should be clearly stated whether this refers to physical size or yield.	Clarification added to Executive Summary	Closed
4	The executive Summary notes in terms of urban planning: "…Second, and relatedly, the case study development costs demonstrate some economies of density. Infrastructure costs per dwelling tend to decline as the density of development on-site increases. This reflects efficiencies that are driven by the spatial proximity of dwellings. Land developments which provide a denser form of housing can generally capitalise on lower infrastructure installation and servicing costs..." This needs to state that there may be in some cases diseconomies of scale due to the density hitting a level the requires infrastructure to be augmented or upgraded.	Additional commenttary on potential diseconomies of scale added to Executive Summary	Closed
5	Key implications: "…Any future greenfield land release will involve building new connecting infrastructure — like utilities and roads — as well as providing new schools and other social infrastructure. As highlighted by the analysis, the costs of these forms of development can be substantial on a per dwelling and per capita basis. These costs are unlikely to moderate going forward. Future releases are likely to involve more challenging sites which may increase development costs and lower block yields…" This statement needs qualification – maybe some examples.	Qualification and example added to Executive Summary.	Closed
6	Key implications: "…However, the costs of pursuing infill developments such as those examined in this study will not necessarily be lower by orders of magnitude. Much will depend on identifying sites where infrastructure capacity can be readily absorbed. Better information on these constraints would support effective long term planning…" this paragraph shows the report needs consistency in message, as parts suggests that infill is cheaper to build but only because of the examples provided.	No direct change to paragraph. Addressed through alignmnet of messaging across report.	Closed
7	Summing Up: "…Major greenfield developments on Canberra's northern and western regions have significantly higher capital costs associated with providing essential infrastructure compared with infill developments…" I think it would be good to qualify this statement by demonstrating why the western regions have higher capital costs (due to typography etc.).	Additional commentary added.	Closed
8	Summing up: This dot point (pg 9) "…Higher density developments allow for economies of scale for a range of infrastructure types and the centralisation of services means that maintenance works are simpler and more effective…" is inconsistent with paragraph on pg 8 "…First, there are no obvious economies of scale across the suite of case studies. That is, the costs per dwelling do not consistently decline as the size of development increases…" again consistency in reporting.	Point updated to state that economies of scale do not clearly exist for developments. An additional point was added stating that the survey size is limited providing less abiltiy to identify this type of trend.	Closed
9	The figures provided (as set out below) do not appear to have been used in the Final Draft report in any of the infill developments. Happy to be corrected if I am misreading the report;	These figures have been used in the model. Costs have been apportioned across their relevant infrastructure area i.e water costs across mains to development and reticulation.	Closed
10	The figures included for Campbell 5 project report do not appear to have changed in the Final Draft report;	Figures have now been updated in the latest report.	Closed
11	On page 20, section 4.1 the report states in relation to the Athllon Dr project that "only stages with known costs and quantities have been examined". The Athllon Dr figures were estimates provided in 2012, they are not "known costs";	Wording updated to "known or estimated…"	Closed
12	Figure 6 in the 16/10/18 report shows that the Furzer St development included Block 10 Section 9 Phillip (Aviation House). This is incorrect.	Furzer st development map updated to remove hatching over Aviation House.	Closed

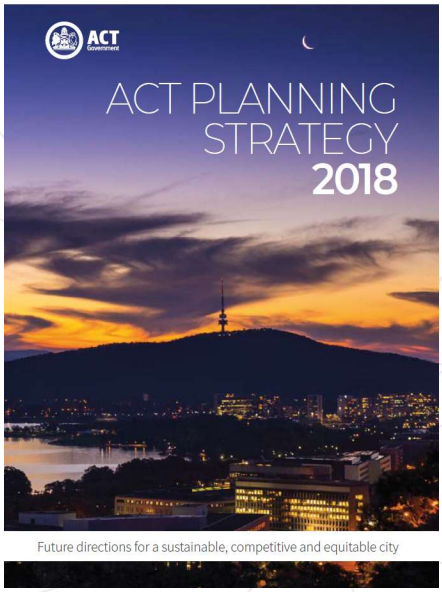
13	Campbell 5 was delivered based on 528 dwellings, not 993. Where did the 993 dwelling number come from?	Dwelling numbers for C5 updated to 528. Previous figures incorporated the commercial space within the development however this has now been added as a comment on the per dwelling cost for C5 rather than included in the model.	Closed
14	Table 17 figures are the same as draft 16/10/18 is this correct with the updated figures?	Table 17 (now table 16) figures updated.	Closed
15	Can we pull out the cost of open space from the Social infrastructure as a subsection to outline these costs?	All social infrasturcture cost categories have been split out in the report.	Closed
16	• The Taylor figures that we provided were for Taylor 1 which was 843 dwellings and was broken down into sub stages: For Taylor 1 Stages 1, 2, & 3, total costs below for capital costs: o Taylor 1 Stage 1 □ Roads - $8.7M □ Stormwater - $4.9M □ Landscaping - $7.0M (this includes the playground) □ Footpaths - $2.6M □ Driveways - $1.4M □ Streetlights - $1.6M □ Water Supply – $1.4M □ Sewer - $2.0M o Taylor 1 Stages 2&3 □ Roads - $9.5M □ Stormwater - $6.1M □ Landscape - $4.3M (this includes the playground) □ Footpaths – $3.1M □ Driveways - $2.0M □ Streetlights - $1.3M □ Water Supply – $2.1M □ Sewer – $2.4M Have these costs been used? If so the report need to be updates with dwelling numbers and site boundaries.	Taylor stages/substages were misinterpreted. Costs and dwelling numbers have been updated in the model and output results and tables updated throughout the report.	Closed
17	Density • Could we calculate the dwelling densities on: Dwellings per a hectare Low Density: 1-24 Medium Density: 25-60 High Density: 61 and above	Development densities recalculated and updated to these categories within the report	Closed
18	Model: There are some Inputs Costs Just to clarify the costs within the Input cost sheet. They seem very high. Campbell 5 – landscape area $169,223,730 Redhill - landscape area $200,958,176 Also the default costs for landscape seem very high.	As discussed these costs are unit costs per km^2.	Closed

Greenfield and infill development in the ACT – Comparative cost study

13 December 2018

ACT Planning Strategy 2018

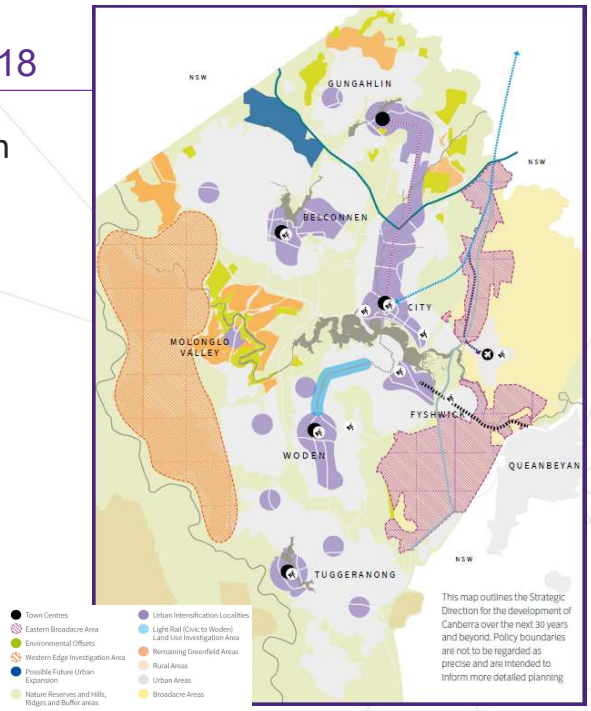
- ACT Planning Strategy 2018 key strategic direction is to create a more compact and efficient city
- Making the best use of existing land, infrastructure and assets to provide for a high quality of living



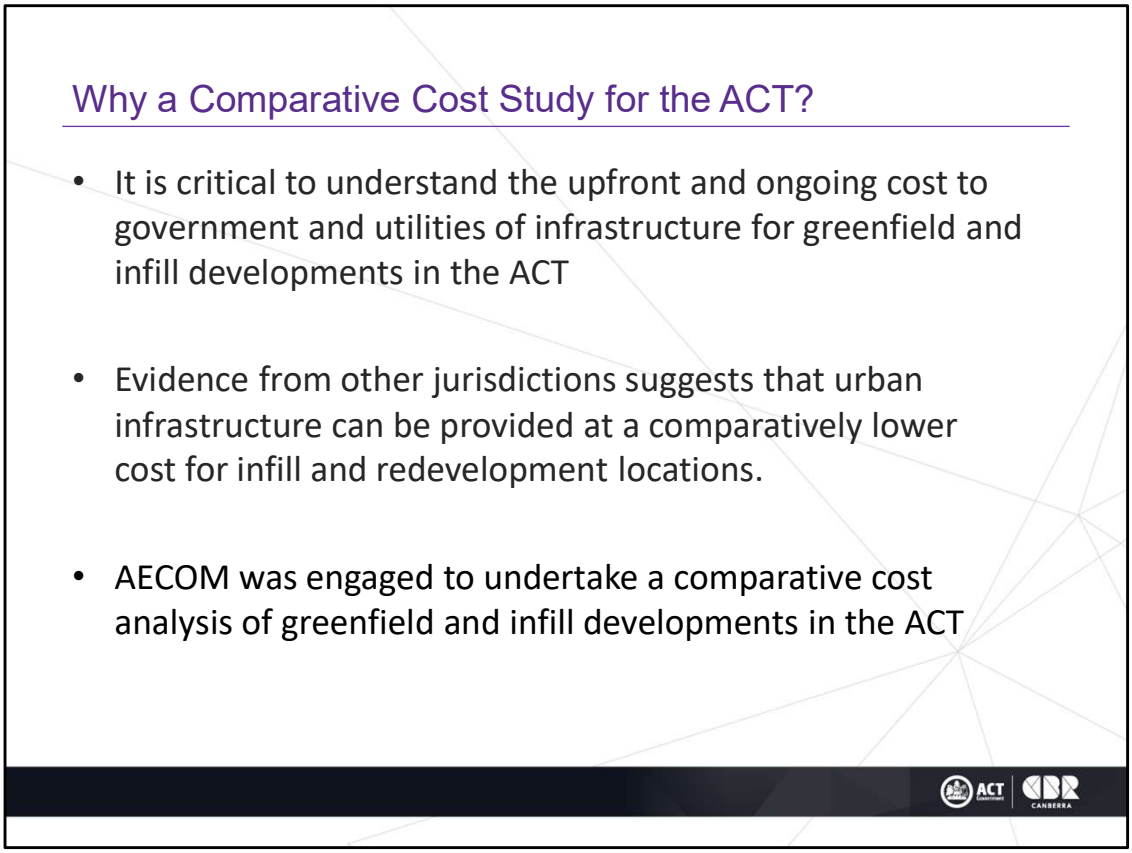
The central theme of the ACT Planning Strategy is to create a more compact and efficient city. Making the best use of existing land, infrastructure and assets to provide for a high quality of living. This approach to the future development of our city will improve accessibility and physical connections.

ACT Planning Strategy 2018

- Balancing growth between greenfield and infill development
- Choice between the different options depends on a range of factors
- One being the cost of development to Government



There are many alternative ways in which additional people could be accommodated in the ACT. These include, for example, development on the metropolitan fringe classified as greenfield development. It could also include options for differing levels of density within infill areas depending on the proximity of these locations to centres or transport corridors. The choice between the different options depends on a range of factors, one being the cost of development to Government and in-particular the cost of providing access and services to the community. This, in turn, relates to the capacity of the existing underlying infrastructure that is required to deliver services to the community.



To achieve more efficient and cost effective growth paths it is critical to understand the upfront and ongoing cost to government and utilities of infrastructure for greenfield and infill developments in the ACT.

Evidence from other jurisdictions suggests that urban infrastructure can be provided at a comparatively lower cost for infill and redevelopment locations because it is more cost effective to utilise existing capacity and/or 'augment' existing systems, compared to constructing new systems for greenfield sites. This applies to a full range of urban infrastructure including roads, drainage, utility services, schools and other social infrastructure.

To support these findings from other jurisdictions EPSDD identified the need to establish infrastructure costs specifically identified for ACT development.

AECOM consultants was engaged to undertake a comparative cost analysis of greenfield and infill developments in the ACT to inform policies within the ACT Planning Strategy Refresh.

The study has provided comparative capital and ongoing cost analysis of greenfield and infill developments in the ACT for physical and social infrastructure that has provided a number of key findings that have supported the policy development in the new Strategy.

Chris Nadarajah Associate Director – Economics from AECOM will present on the methodology and key findings from the study

ACT Government

COMPARATIVE COST STUDY

GREENFIELD AND INFILL DEVELOPMENTS IN THE ACT

ENVIRONMENT, PLANNING
AND SUSTAINABLE
DEVELOPMENT

FEBRUARY 2019

CONTENTS

COMPARATIVE COST STUDY - GREENFIELD AND INFILL DEVELOPMENTS IN THE ACT

BACKGROUND AND CONTEXT

Australian cities, including Canberra, have developed at comparatively low densities and cover large footprints. Concerns about the economic, social, environmental and other effects of urban expansion have focused attention on the nature of city growth and the efficiency with which it is being managed. In Australia's largest cities there has been significant debate about how rapid population growth is contributing to lower levels of amenity, higher costs of housing and urban congestion.

A general response by governments to facilitate more efficient urban land use has been to raise utilisation of existing and new infrastructure by promoting increased urban density. This has occurred via measures to encourage infill and higher density housing developments. Over the last 10 years, Canberra has seen significant intensification of urban development, driven by new infill developments in Belconnen, Kingston and Braddon.

This has also been complemented by major greenfield land releases in the Gungahlin and Molonglo areas. The ACT Government is currently refreshing its Planning Strategy which will guide Canberra's land use planning to 2045. To help inform this process, AECOM was engaged to undertake a comparative cost analysis of greenfield and infill developments in the Territory.

It is important for policy development that there is a full understanding of the financial costs to government, and ultimately the community, in meeting future urban development through greenfield or urban consolidation projects, or both.

This study provides a contemporary assessment of the cost implications of different housing developments across the Territory. It examines a range of case studies encompassing large suburban greenfield developments and denser inner city housing projects.

IMPORTANCE OF URBAN INFRASTRUCTURE

Urban infrastructure comprises the capital works required for households to access major economic and social services. It has two major components.

The first category is 'economic' infrastructure, which comprises networked services such as hydraulic facilities, highways and other transport facilities, and energy distribution networks. For new land releases, the provision of economic infrastructure involve works within the development (or 'on-site'), as well as 'off-site' facilities which integrate the new development with the network.

For water systems, for example, these comprise:

- reticulation (e.g. minor works within the boundaries of a development)
- distribution works (e.g. collection sewers, water supply regional mains and main drains)
- headworks (e.g. dams, major sewage treatment plants).

Similar categorisations apply for other types of networked services such as energy supply, telecommunications and even roads.

The second category, 'social' infrastructure, comprises a broad range of facilities that provide community services such as education, health and leisure.

In general, private land developers provide most of the infrastructure contained within the boundaries of the development. For example, developers usually provide reticulation of water and sewerage systems, local surface drainage works, open space, and local roads and traffic works. There are some cases where public authorities rather than developers provide on-site infrastructure. Off-site infrastructure is generally provided by public authorities. In some cases, developer contributions are sought.

The provision and use of any form of urban infrastructure, as highlighted in this study, are important for a range of reasons:

- The **investments are generally very large**
- The **costs are usually 'sunk'** — once the infrastructure is provided it is difficult or impossible to find alternative uses for it (for example, in the case of a storm water system)
- **Asset lives are generally long** — this means that planning periods related to the use of the asset are also long
- The services which the infrastructure provides are often **major inputs into a wide range of other industries and activities**
- The **provision of one type of infrastructure can impact on other types** — for example, the provision of road links will influence the pattern of demand for social infrastructure and services.

COMPARATIVE ANALYSIS OF DEVELOPMENT CASE STUDIES

The analysis examined a range of residential greenfield and infill developments of various sizes and locations in the ACT. At one end of the spectrum are large greenfield land releases. These developments represent an expansion in Canberra's urban footprint and the approach for enabling the release of new house and land packages to the public at scale. At the other end are smaller infill projects which increase the density of Canberra's housing stock.

The scenarios provide a broad cross-section of the development options that are likely to face the ACT Government over the short to medium term, including as part of implementing the refreshed Planning Strategy.

Comparative analysis of development sites has adopted a whole-of-life perspective. Costs encompass the value of preparing sites for release and providing essential infrastructure services such as utilities and roads. Both capital and recurrent (operation and maintenance) costs are examined. The costs of key social infrastructure such as open space and schools (for the Taylor development) are also included within the cost framework.

It is important to note that this study focuses on the cost side of land release and urban planning considerations. It does not examine the value of developed blocks and the potential revenues associated with land release.

The greenfield developments of Taylor and Whitlam have significantly higher costs than other developments. The total cost per dwelling for the Taylor development is around $57,600 per dwelling, while the costs for Whitlam are $68,600 per dwelling. Much of the cost of these greenfield sites is driven by the provision of new schools to service the expansion. These are significant capital and ongoing investments to enlarge the footprint of the city and deliver core education services. In terms of economic infrastructure, costs for providing water, sewer and stormwater networks are also significant. Moreover, the extension of network infrastructure for new developments involves higher recurrent costs (opex) as larger networks impose new maintenance and servicing needs.

The cost of the infill developments examined in this study is markedly lower. These developments are located in well-established areas and are already serviced by trunk infrastructure. They also require much lower forms of additional social infrastructure, with new residents able to access existing public schools. The Furzer Street and Athllon Drive redevelopments have the lowest costs per dwelling, at around $6500 and $8500 respectively. These developments are highly cost efficient and involve adding dense housing to a relatively high-density area on a flat and well-serviced site.

In terms of urban planning, the case analysis highlights two important issues:

- First, the infill developments show some economies of scale, with declining unit costs as the number of dwellings increases. This reflects their capacity to utilise spare capacity within existing infrastructure networks. Where this capacity exists, it points to

potential cost advantages from increasing lot yields on a particular parcel of land and minimising road and trunk infrastructure distances. Clear trends for greenfield developments are difficult to identify as only two greenfield sites have been analysed within this study.

- Second, and relatedly, the case study development costs demonstrate economies of density. Infrastructure costs per dwelling tend to decline as the density of development on-site increases. This reflects efficiencies that are driven by the spatial proximity of dwellings. Land developments which provide a denser form of housing can generally capitalise on lower infrastructure installation and servicing costs.

It is important to note that these efficiencies have practical limits. At some point, increasing site density or yield will add to rather than reduce average development costs, particularly if it triggers major on or off-site infrastructure augmentation. It might also diminish the commerciality of the development by eroding its overall amenity. These issues will need to be considered in devising urban planning or site development strategies.

While the magnitudes of site development cost estimates in this study are highly varied, they broadly accord with the patterns shown in other jurisdictions. In general, studies have demonstrated that there are substantial cost savings available from urban consolidation that can minimise government outlays upfront and over time.

However, cross-jurisdictional comparisons of development costs should be treated with caution. Differences in coverage, methodologies and assumptions, especially in apportioning the costs and benefits of legacy infrastructure, can swing estimates. As demonstrated in this study, relevant data availability and quality is patchy. The analysis is also based on a relatively small sample size which means that one or a few atypical development costs, either high or low (for example, if little infrastructure augmentation is needed), can have a significant bearing on the overall cost landscape.

Comparison with costs in other jurisdictions

Development costs across Australia vary depending on a large range of factors including the availability of resources, demand, labour force, land and the topography of development sites. In order to benchmark the results of the analysis performed for the ACT, we examined the costs associated with developments in other major cities.

While an extensive amount of research exists for cost comparisons of infill and greenfield developments, there are limited studies which take a 'total cost' approach, as undertaken for this study. Differences in coverage, methodologies and assumptions, especially when apportioning costs and benefits, can significantly alter cost estimates. A key issue is whether developer contributions or building levies are imposed to help meet the costs of infrastructure provision. These are large, single-item costs which are not applied across all jurisdictions (for instance, contributions apply in NSW but not the ACT).

The 2013 study '*Urban Infill Vs Greenfield Development'* by InfraPlan stated that it would be reasonable to apply a greenfield infrastructure cost in the range of $61,600 - $80,500 per lot and $15,000 - $25,000 per dwelling for infill.

The findings of this analysis fall slightly below the median values for Greenfield developments in Table 16, however they are within the ranges for both infill and greenfield

developments. In general, studies confirm that there are substantial cost savings available from urban consolidation that can minimise government outlays upfront and over time.

Cross-jurisdictional comparisons of development costs should be treated with caution. There are a number of factors that may influence outcomes of the cost comparisons across jurisdictions including the planned nature of infrastructure in the ACT, access to resources and demand for housing. It is important to note that for each analysis only a few developments were able to be compared which may lead to discrepancies in cost comparisons.

KEY IMPLICATIONS

As part of refreshing the ACT's Planning Strategy, the Government has reconfirmed its commitment to developing a more compact city. This policy has a number of attractions. It can promote a more vibrant and accessible urban environment, where there are greater opportunities for social and economic engagement. It can also be a cost efficient approach to managing urban growth.

While driving greater compactness entails a heavy reliance on urban consolidation, it is likely that new developments on Canberra's fringe will also be needed. Indeed, some future greenfield projects are currently earmarked within the ACT's four-year land release strategy.

Any future greenfield land release will involve building new connecting infrastructure — like utilities and roads — as well as providing new schools and other social infrastructure. As highlighted by the analysis, the costs of these forms of development can be substantial on a per dwelling and per capita basis. These costs are unlikely to moderate going forward. Future releases are likely to involve more challenging sites which may increase development costs and lower block yields. For instance, new greenfield expansion to the west and south of
Canberra's existing suburban footprint will potentially involve steeper site gradients, greater bushfire setbacks and abatement controls, new bridge crossings of the Molonglo and Murrumbidgee rivers, and/or significant flood mitigation works.

SUMMING UP

The costs of providing infrastructure and services (including capital and recurrent costs) to residents in different urban areas vary for a range of reasons, including the geographical and topographical features of the suburb or individual site, the proximity of developments to existing infrastructure, and the capacity of that infrastructure.

This study provides a number of overarching findings regarding the cost of greenfield and infill developments in the ACT.

- Major greenfield developments in Canberra's northern (Taylor) and western (Whitlam) regions have significantly higher capital costs associated with providing essential infrastructure compared with infill developments. These expansive greenfield developments each involve major civil works, in particular preliminary earth works related to the undulating terrain in Molonglo, as well as new road connections.
- The extension of network infrastructure required to service new developments where infrastructure is not readily available means that the recurrent cost (opex)

requirements are also higher than for infill developments that are able to utilise existing infrastructure.

- Infrastructure costs per dwelling tend to decline as the density of development on-site increases, however these cost advantages become more marginal between medium and high density sites.
- Infill developments allow for economies of scale for a range of infrastructure types, where additional network capacity is available, and the centralisation of services means that maintenance works are simpler and more cost effective.

ENVIRONMENT, PLANNING AND SUSTAINABLE DEVELOPMENT

FEBRUARY 2019

Greenfield and Infill Development in the ACT: Comparative Cost Study

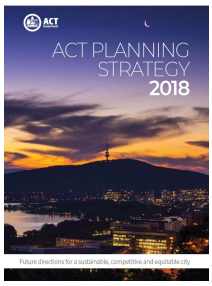
Infrastructure & Planning Advisory Committee

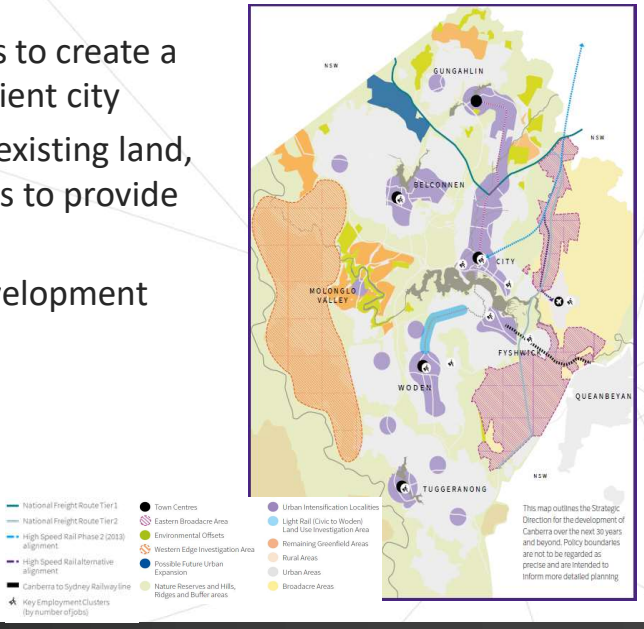
1 October 2019

ACT Government

Context for Study: ACT Planning Strategy 2018

- Key strategic direction is to create a more compact and efficient city
- Making the best use of existing land, infrastructure and assets to provide for high quality of living
- Greenfield and infill development





The central theme of the ACT Planning Strategy is to create a more compact and efficient city. Making the best use of existing land, infrastructure and assets to provide for a high quality of living. This approach to the future development of our city will improve accessibility and physical connections.
Strategic Direction 1.3 – Use infrastructure efficiently to support our growing community (p46)
Strategic Direction 2.6 – Protect and enhance infrastructure that supports the economic development of Canberra and the region (p62)

Rationale: Why a Comparative Cost Study for the ACT?

- Evidence from other jurisdictions suggests that urban infrastructure can be provided at a comparatively lower cost per capita for infill and redevelopment locations
- Critical to understanding in the ACT both upfront capital and ongoing cost to government of infrastructure for greenfield and infill developments, accounting for trunk infrastructure and some social infrastructure
- Addressing identified need for ACT-specific understanding of development infrastructure costs to inform policy decisions

To achieve more efficient and cost effective growth paths it is critical to understand the upfront and ongoing cost to government and utilities of infrastructure for greenfield and infill developments in the ACT.

Evidence from other jurisdictions suggests that urban infrastructure can be provided at a comparatively lower cost for infill and redevelopment locations because it is more cost effective to utilise existing capacity and/or 'augment' existing systems, compared to constructing new systems for greenfield sites. This applies to a full range of urban infrastructure including roads, drainage, utility services, schools and other social infrastructure.

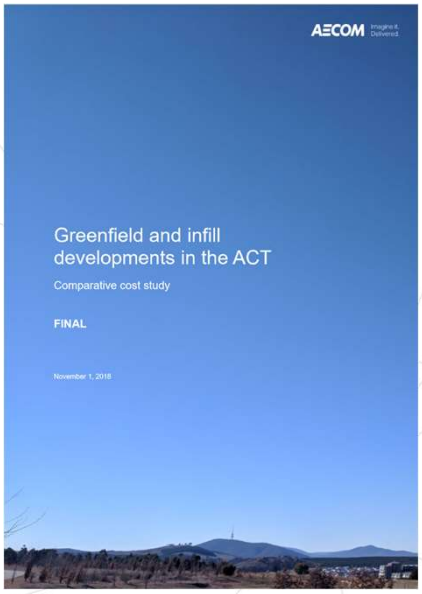
To support these findings from other jurisdictions EPSDD identified the need to establish infrastructure costs specifically identified for ACT development.

AECOM consultants was engaged to undertake a comparative cost analysis of greenfield and infill developments in the ACT to inform the refresh of the ACT Planning Strategy in 2018.

The study has provided comparative capital and ongoing cost analysis of greenfield and infill developments in the ACT for physical and social infrastructure that has provided a number of key findings that have supported the policy development in the Planning Strategy.

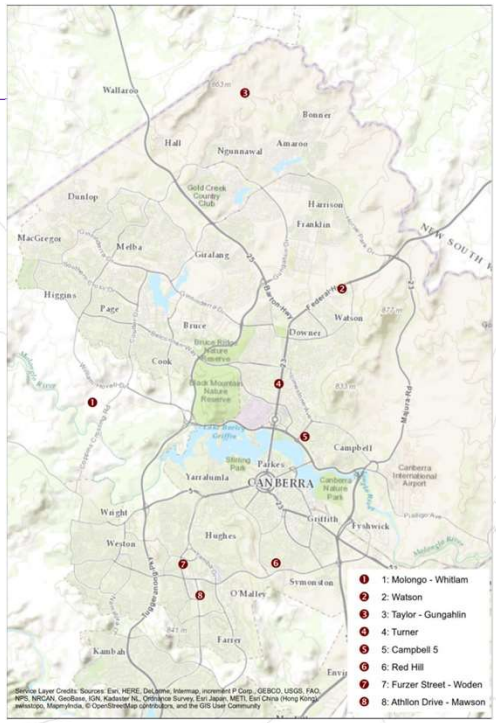
Methodology and Outputs

- AECOM Urban Development Cost Model
- Developed from eight case studies demonstrating relative comparative cost advantages of infill over greenfield development
- Case studies were chosen as representing typical development types, densities and locations in the ACT



Case Studies

- Eight case study sites:
  - Taylor – Gungahlin
  - Watson
  - Campbell 5
  - Turner
  - Whitlam – Molonglo
  - Red Hill
  - Furzer Street – Woden
  - Athllon Drive – Mawson
- Represent cross-section of expected development options
- Mix of greenfield and infill for Northside and Southside locations



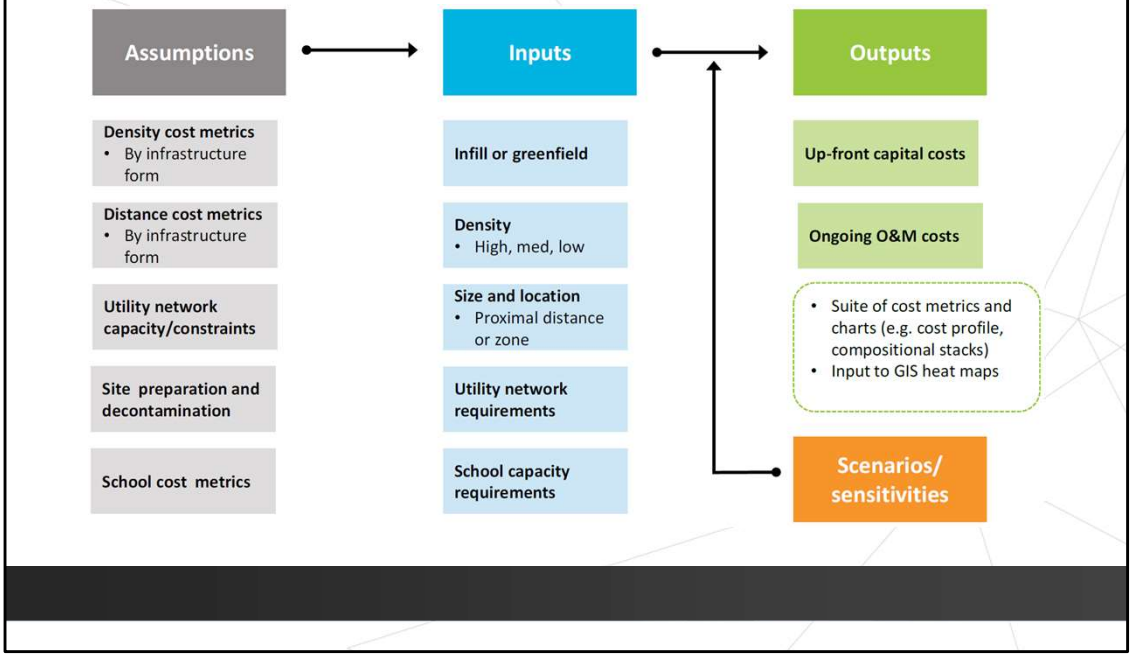
Summary of Case Studies

Northside	**Location**	Taylor 1- Gungahlin (Stage 1, 2, 3)	Watson Section 76 and 74 Between Federal Highway and Antill Street	Campbell – corner of Constitution Ave and Anzac Parade	Northbourne Flats site – Northbound Avenue, Turner
	Density	Low	Low	High	High
	Form	Sub division land release	Mixed residential	High rise apartments and commercial space	High rise apartments
	Size	843 dwellings	560 apartments/townhouses	528 dwellings	565 dwellings
	Development type	Greenfield	Dispersed infill	Dispersed infill	Infill
Southside/Westside	**Location**	Whitlam - Molonglo	Athllon Drive – Phillip/Mawson	Red Hill – on Lady Nelson Place and Cygnet Crescent	Furzer Street - Woden
	Density	Low	Low	Medium	High
	Form	Sub division land release	Multi-use mixed residential/commercial	Mixed residential	High rise apartments and townhouses
	Size	2100 dwellings	1250 dwellings, 600m^2 commercial space	243 dwellings	300 dwellings; 400 m^2 of commercial space
	Development type	Greenfield	Dispersed infill	Infill	Infill

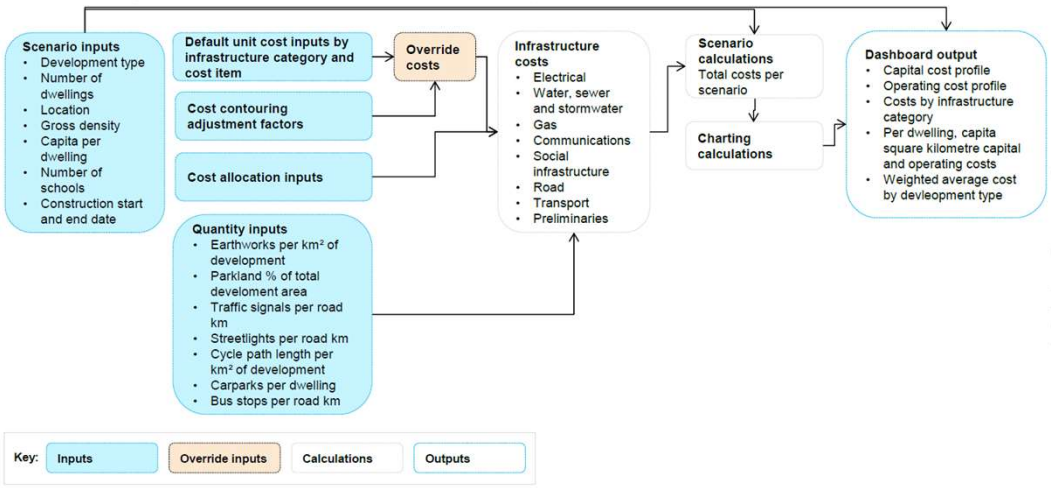
Findings

- Economies of scale and density exist in delivering infrastructure to service housing in the ACT
- Confirmed trends observed in other jurisdictions around Australia for the ACT through a series of case studies using Canberra specific information in regard to urban infrastructure costs
- Study found infrastructure servicing costs are up to three times greater for new greenfield areas than urban infill locations

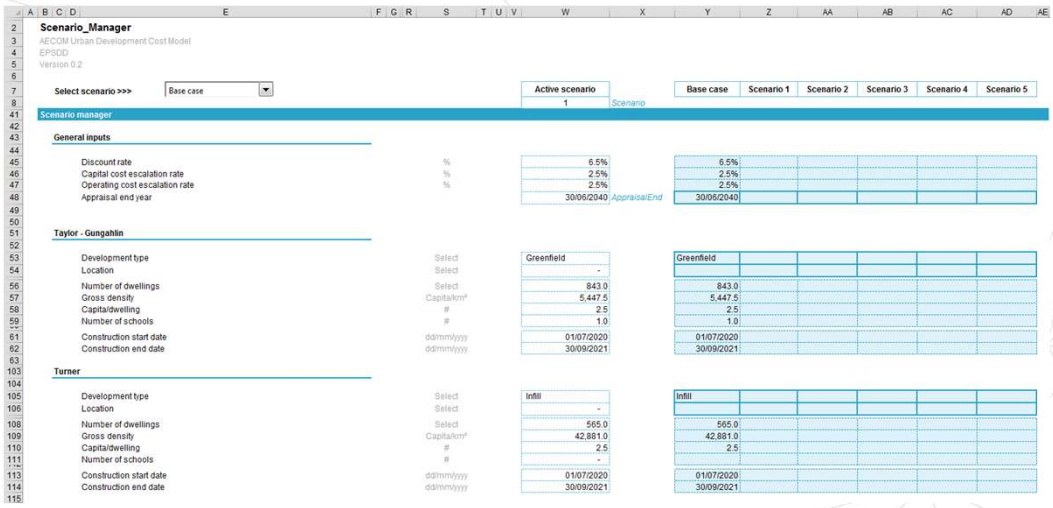
Urban Development Cost Model Summary



Urban Development Cost Model Structure



Define Case Studies & Scenarios



Scenario_Manager

AECOM Urban Development Cost Model

EPSDD

Version 0.2

Select scenario >>> Base case

	Active scenario		Base case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	1	Scenario						
Scenario manager								
General inputs								
Discount rate	6.5%	%	6.5%					
Capital cost escalation rate	2.5%	%	2.5%					
Operating cost escalation rate	2.5%	%	2.5%					
Appraisal end year	30/06/2040	Appraisal/End	30/06/2040					
Taylor - Gungahlin								
Development type	Greenfield	Select	Greenfield					
Location	-	Select						
Number of dwellings	843.0	Select	843.0					
Gross density	5,447.5	Capita/km²	5,447.5					
Capita/dwelling	2.5	#	2.5					
Number of schools	1.0	#	1.0					
Construction start date	01/07/2020	dd/mm/yyyy	01/07/2020					
Construction end date	30/09/2021	dd/mm/yyyy	30/09/2021					
Turner								
Development type	Infill	Select	Infill					
Location	-	Select						
Number of dwellings	565.0	Select	565.0					
Gross density	42,881.0	Capita/km²	42,881.0					
Capita/dwelling	2.5	#	2.5					
Number of schools	-	#						
Construction start date	01/07/2020	dd/mm/yyyy	01/07/2020					
Construction end date	30/09/2021	dd/mm/yyyy	30/09/2021					

Screen shot from ACT Urban Development Cost Model

Model Output Results

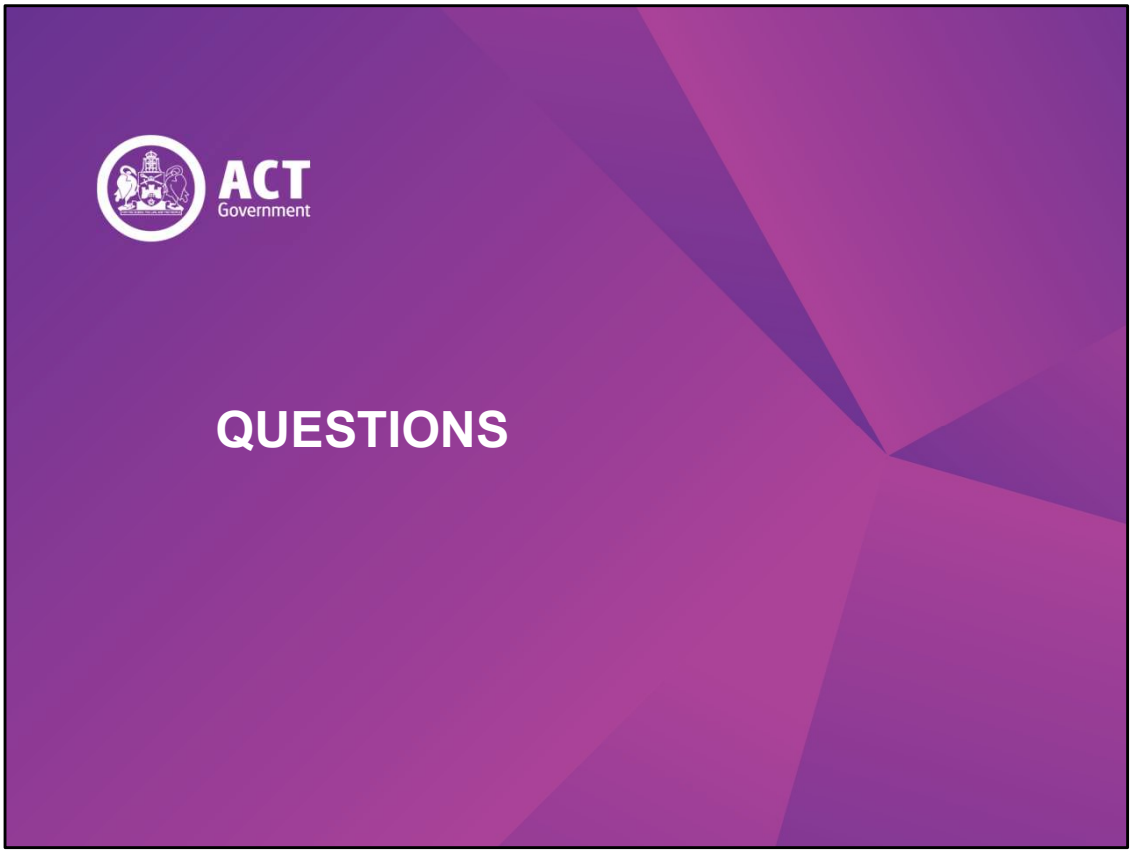
Comparative costs of housing development sites

Development	No. of dwellings	Total capex (million)	Total opex (million)	Total cost (million)	Total cost per dwelling
Taylor 1, Gungahlin Greenfield, Sub division land release	843	$44.45	$4.10	$48.55	$57,588
Whitlam, Molonglo Greenfield, Sub division land release	2100	$134.20	$9.87	$144.07	$68,604
Watson Dispersed infill, Mixed residential	560	$10.68	$0.64	$11.32	$20,211
Athllon Drive, Phillip/Mawson Dispersed infill, Multi-use mixed residential/commercial	1250	$9.25	$1.38	$10.63	$8505
Furzer Street, Woden Infill, High rise apartments/commercial	480	$2.81	$0.33	$3.13	$6530
Campbell 5, Campbell Dispersed infill, mixed residential	528	$11.75	$0.42	$12.17	$23,052
Red Hill Infill, mixed residential	243	$9.88	$1.84	$11.72	$48,240
Turner Infill, High rise apartments	565	$8.64	$0.85	$9.48	$16,786

Total cost per dwelling compares with other jurisdictions:
Adelaide – Infill $20,000, Greenfield $80,500
Sydney – Infill $15,300, Greenfield $79,800
Canberra – Infill $16,123, Greenfield $65,448

Next steps

- Use the results from this study to better inform policy decisions on future land use and urban form
- Utilise cost model for future development sites including; Molonglo 3, East Lake, Kenny and Western Edge
- ACT Planning Strategy 2018 implementation and infrastructure planning:
  - Infrastructure capacity study for the urban intensification areas identified by Strategy's Policy Plan
  - Preliminary infrastructure investigations for Western Edge Investigation Area
- Update assumptions book and model parameters every 5 years to maintain relevance and currency


ACT
Government
QUESTIONS

Comparative Cost Study of Greenfield and Infill Development in the ACT – AECOM Presentation

TALKING POINTS

Introduction – technical analysis supporting the refresh of the ACT Planning Strategy

- The central theme of the ACT Planning Strategy is to create a more compact and efficient city. Making the best use of existing land, infrastructure and assets to provide for a high quality of living. This approach to the future development of our city will improve accessibility and physical connections.

- There are many alternative ways in which additional people could be accommodated in the ACT. These include, for example, development on the metropolitan fringe classified as greenfield development. It could also include options for differing levels of density within infill areas depending on the proximity of these locations to centres or transport corridors. The choice between the different options depends on a range of factors, one being the cost of development to Government and in-particular the cost of providing access and services to the community. This, in turn, relates to the capacity of the existing underlying infrastructure that is required to deliver services to the community.

- To achieve more efficient and cost effective growth paths it is critical to understand the upfront and ongoing cost to government and utilities of infrastructure for greenfield and infill developments in the ACT.

- Evidence from other jurisdictions suggests that urban infrastructure can be provided at a comparatively lower cost for infill and redevelopment locations because it is more cost effective to utilise existing capacity and/or 'augment' existing systems, compared to constructing new systems for greenfield sites. This applies to a full range of urban infrastructure including roads, drainage, utility services, schools and other social infrastructure.

- To support these findings from other jurisdictions EPSDD identified the need to establish infrastructure costs specifically identified for ACT development.

Comparative Cost Study – Greenfield and Infill Developments in the ACT

- AECOM consultants was engaged to undertake a comparative cost analysis of greenfield and infill developments in the ACT to inform policies within the ACT Planning Strategy 2018.

- The study has provided comparative capital and ongoing cost analysis of greenfield and infill developments in the ACT for physical and social infrastructure that has provided a number of key findings that have supported the policy development in the ACT Planning Strategy 2018.

Chris Nadarajah Associate Director – Economics from AECOM will present on the methodology and key findings from the study.

Next Steps

- This study by AECOM has provided a comprehensive foundation to assess the costs of providing infrastructure and services to residents in different urban areas.

- The study and modelling tool presents the opportunity to Government to further gather and analyse development cost data to better understand the cost implications and long term infrastructure investment opportunities to the ACT.

- The study has demonstrated that infill development and redevelopment are more cost effective than greenfield developments on the basis of infrastructure costs. It has reinforced the complexity of infrastructure investment to continue to meet the needs of a growing Canberra.

- Further infrastructure investigations will be undertaken as part of the implementation of the ACT Planning Strategy for significant infill and redevelopment areas within Canberra's existing urban footprint. These will help forecast infrastructure demands at different growth scenarios and identify potential stress points for existing infrastructure networks and requirements for future proofing.

- Other infrastructure investigations will help determine the feasibility, suitability and priority of development along the western edge. The location and staging of future greenfield areas must represent a logical and cost-effective expansion of Canberra's urban area, while recognising the need to provide choice of housing type and to protect environmental values.