16: Forestry

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16 Forestry

16.1 Service Description

This service involves the planning, maintenance, and operational activities required to provide effective and sustainable management of the Council's forestry resources.

SDC and its predecessors have been involved in forestry for over a hundred years. Forestry started with the early County Council's being vested with land to establish plantations. The purpose of these plantations was to provide shelter and soil protection. The Selwyn Plantation Board took on the management of the larger tracts of forest leaving smaller sites to be administered by Councils.

The Council has adopted standard forestry industry management practices in relation to this activity. The forestry operation is managed through an agreement with Ashburton District Council who provide all forest management services on a consultancy basis. The Council does not have any joint ventures or forestry right arrangements with its plantations.

The Council has a total of 55 sites across the district that are currently identified for forestry purposes with a combined land area of 122.2 hectares and the afforested area of 102.5 hectares. The majority of the sites are reserves being either disused gravel reserves, undeveloped parts of other recreation reserves or cemeteries. Most of the sites are small in area (2 hectares or less) with the largest being 10.6 hectares. The afforesting of these areas has historically been used as a land management practice to maintain the sites and to generate a return from land that would otherwise be unused.

Council's forests suffered significant damage during a series of wind storms in late 2013, with 30% of sites receiving a high to medium loss and a further 45% incurring some loss. As a result of forced harvest and losses the area of stocked with a forest crop was significantly reduced. This situation, coupled with financial returns from timber sales trending downwards, has prompted Council to rethink its future involvement in forestry operations.

A decision was made to initiate a phased withdrawal from productive forestry operations over time.

With forestry no longer a viable option (the commercial return and other benefits are considered insufficient to warrant continued investment in this activity) as a means of land management, the Council will phase out its involvement in productive forestry activities in the future. It may however still maintain forests for other recognised purposes, such as recreation and forest preservation (McHughs Forest Park for example). Emphasis is on maintaining the sites in a safe and tidy state until a clear direction for each site is known, whether this is to utilise for alternative purposes (native planting or recreation), lease or disposal.

A planned withdrawal from forestry will involve land use assessment on a block by block basis to determine the best long term outcome for each site based on analysis of potential uses, identification of limitations and cost limitations. In order to minimise costs to Council (such as ETS obligations to pay carbon credits for deforestation) some of the de-stocked land has been replanted in exotic forest crops and one site in native species. This will enable the ETS credit requirements to be met once the replanted areas reach the required age (8-10 years). Council may then consider the sale of land and forest (subject to reserve revocation processes being successful).

16.1.1 Rationale for Council's Involvement

The ownership and management of SDC's existing forestry asset is largely based on the historic inheritance of miscellaneous parcels of land that have over time been planted in trees for a variety of reasons.

The Council has previously utilised forestry principally, as a means of managing redundant land that it owns or controls in a sustainable manner. Forestry on these sites has enabled the land to be maintained at a minimal cost and generated some commercial return to Council.

As per 16.1 above, Council has made a strategic decision to withdraw from active forestry operations through changing land use or disposing of assets. Because of this, Council's primary purpose for Forestry as a means of land management is likely to change over time. Recent developments such as the purchase of McHugh's plantation (see 16.2 below) near Darfield, primarily for forest preservation and recreation

purposes, is an example of how Council's rationale for involvement in forestry activities might change in future.

Forestry benefits the community in the following way:

- Enables sustainable management of Council land that would otherwise be unproductive
- Helps to prevent soil erosion on the plains
- Provides a marginal economic benefit through the revenue gained from log sales
- Helps to absorb carbon dioxide and reduce the amount in the atmosphere
- Contributes to the rural landscape character of the district
- Can provide areas for passive recreational use
- Biodiversity values

16.2 Strategic Directions

16.2.1 Forestry Ownership and Management

The Council's involvement in Forestry has been primarily as a land management tool rather than as a commercial venture. Although this is not the principal aim of Council's involvement with this activity and there are other identified benefits, it is prudent for Council to consider long term implications and options.

The following factors have been considered by Council is relation to the future direction of this activity:

- The dispersed nature of the sites (many small sites);
- Relatively low productivity and subsequent financial returns;
- The lack of in-house expertise in forestry management;
- The reliance on external resources to provide advice on forestry management;
- The control and management of forestry operational works such as pruning and harvesting from a health and safety perspective;
- The cost of maintenance and especially noxious weed control;
- The damage that has occurred as a result of wind storms and the cost of site remediation from this;
- The likelihood of further significant wind events on the plains as a result of climate change (it is predicted that events of >140 kph will increase in frequency) which will increase the risk to forests;
- The ETS implications of deforestation.

The cash-flow scenario for the LTP indicates that there will be a forecast annual deficit for most years over the next 10 years. This is directly attributable to the age distribution of the tree crop with few areas identified for harvest during the planning period apart from year 10. This situation is partly a result of the early harvest of trees due to damage from the 2013 wind storm and the restocking programme that has followed from that.

The commercial return and other benefits are considered insufficient to warrant continued or additional investment in this activity. The Activity Management Plan assumes that Council will phase out its involvement in productive forestry activities as a means of land management in future. It may however still maintain forests for other recognised purposes, such as recreation and forest preservation (McHughs Forest Park).

Previous direction from Council has indicated a preference for withdrawal from forestry to be undertaken in the most expeditious way that minimises costs to Council (such as ETS obligations to pay carbon credits for deforestation). The deforested blocks have largely been replanted to avoid having to pay ETS liabilities for destocked land and once they reach nine years in age the carbon credits will be recognised. Ultimately this would see the blocks on sold (land and forest).

As most of the forests are situated on Crown reserves disposal will need to follow the revocation process under the Reserves Act which may take a period of time.

A withdrawal from forestry would involve land use assessment on a block by block basis to determine the best long term outcome for each site based on analysis of potential uses, identification of limitations and cost implications. It may be prudent for Council to reconsider disposal as the carbon credits held can be used to offset carbon production. This needs to be weighed against the cost of ownership.

16.2.2 McHughs Plantation

This is a stand of around 40 hectares of predominantly Douglas fir species located on the outskirts of Darfield. In September 2013 Council purchased this site from the Selwyn Plantation Board for the purpose of forest preservation and to provide an area for various recreational activities. Since acquiring the site, Council has produced a master plan which is guiding the development and management of the forest via a sustainable canopy system and promoting development of the site for recreational purposes. This site is managed as part of Council's recreation reserves network and is covered in that section of this Activity Management Plan.

16.3 Levels of Service

This section defines the levels of service (LOS) for Forestry and sets out the performance targets identified for each LOS to enable achievement to be measured.

16.3.1 Customers and Stakeholders

Customers and stakeholders with an interest in forestry include the following:

- Selwyn District residents
- Property owners that adjoin forestry blocks
- Environment Canterbury
- Department of Conservation
- Ministry for Primary Industries
- Ministry for the Environment
- Ashburton District Council
- Fire and Emergency NZ (FENZ)
- Forestry contractors
- Local Iwi/Ngai Tahu

16.3.2 Contribution to Community Outcomes

The following table sets out the community outcomes that are relevant to forestry and describes how the service contributes to outcomes.

Community Outcome	How Forestry Contributes
A prosperous community *Selwyn has a strong economy which fits within and complements the environmental, social and cultural environment of the district*	• Provide work opportunities for local contractors • Recreation and educational opportunities
A clean environment *Air, land, water and general environment to be kept in a healthy condition*	• Forests contribute to the mitigation of climate change by converting carbon dioxide from the atmosphere into carbon stored in wood • Forestry helps to prevent soil erosion and nutrient leaching

Table 16-1: Forestry Contribution to Community Outcomes

16.3.3 Service Drivers

Note: Council has made a decision to expedite the process of withdrawing from the Forestry Activity, with focus on the ongoing sustainable management of sites until a decision is made on the future of each respective site.

The key service drivers specific to forestry at this point in time include the following:

- Manage plantations with the lowest possible financial input required to mitigate environmental, market and management risks
- Maintaining forestry sites in a tidy condition
- Protect the health and safety of the community and contractors
- Provide for the sustainable management of surplus land and minimise maintenance requirements
- Ensure the environment is protected and that any adverse impacts on the environment resulting from the management and maintenance of forests is minimised
- Ensure the operation and maintenance of forests complies with all legal requirements, New Zealand Standards, Selwyn District Council Policies and Bylaws

Legislation, Standards and Policies

Specific legislation, standards and planning documents that apply to forestry are described in the tables below. This also explains the implications for levels of service.

Legislation/Standards	LOS Implications
Resource Management Act 1991	Forests are subject to the provisions of this Act It establishes a resource management system promoting sustainable management of resources (land, soil, water and others)
Principles for Commercial Plantation Forest Management in New Zealand	Application of sound ecological, social and economic principles to forest management operations. All forest management practices must meet all statutory requirements and accepted best practices.
Climate Change Response (Emissions Trading Reform) Amendment Act 2020	Provides legislative framework for the reform of the Emissions Trading Scheme and enable regulations to be put in place which contain the operational detail and settings for the scheme.
National Environmental Standards – Plantation Forestry 2018	Permits forestry activities where there are no significant adverse environmental effects Consents required where environmental outcomes are not achieved
New Zealand Environmental Code of Practice for Plantation Forestry 2007	Sets out guidelines that aim to ensure safe and efficient forest operations. These include sound and practical environmental management, maintaining environmental values and safe working environments.
Selwyn District Council District Plan (RMA)	Rules related to the planting and harvesting of plantations
Land and Water Regional Plan (RMA)	To provide clear direction on how land and water are to be managed in the region
Health and Safety at Work Act 2015 (HSWA)	To provide for a balanced framework to secure the health and safety of workers and workplaces
Forests Act 1949	Mechanism allowing landowners access to value of carbon sequestration on land through forest sink covenants
Fire and Emergency NZ Act 2017	Requirements to prevent fire risk
Pesticides Act (1979)	Safe use of pesticides and agrichemicals
Biosecurity Act (1993)	Requirements to control plant and animal pests via the Regional Pest Management Strategy

Table 16-2: Forestry Legislation & Standards

Plan/Policies	LOS Implications
Plantations Management Plan (2003) *(while largely redundant, the principles regarding operational management of the forestry sites in this plan still apply)*	Sets out performance criteria and maintenance practices for managing forests Provide a 20 year forest management programme
Canterbury Regional Pest Management Plan 2018-38	Provides a framework for the efficient and effective management of pest plants and animals in Canterbury under the Biosecurity Act and provides the regulatory requirements for priority pests across the region.

Table 16-3: Forestry Plans & Policies

16.3.4 Customer Expectations and Consultation

Council's knowledge of customer expectations for forestry is based on:

- Public enquiries and complaints received via Service Request System
- Feedback from elected members, general public, community boards and township committees
- Consultation via the LTP/Annual Plan process
- Feedback from the forestry consultant

In general terms forestry is a minor activity undertaken by Council that does not have significant impacts on the wider district community nor generate a high level of customer issues or interest. To a large extent forestry is an internal service to Council and traditionally used as a land management tool and to generate returns. Levels of service, therefore, tend to be technically oriented.

16.3.5 Present and Future Levels of Service and Performance

In establishing appropriate levels of service and performance measures for forestry, it is important to consider the Council's objectives for this activity. While Council is withdrawing from this activity, the existing land parcels and forestry assets need to be maintained to an appropriate standard. With this in mind the primary and secondary objectives for the assets while they remain in Council ownership are:

- Primary objective – sustainable use of rural land or reserves that would otherwise be unused or unproductive
- Secondary objective – to maximise financial returns to Council by minimising input costs and maximising returns (subject to the constraints of meeting the primary objective)

Note: Due to Councils intention to withdraw from this activity, future levels of service will reflect the diminishing involvement in production forestry.

Timeframe for Provision of Forestry Assets

The Council is no longer committed to the current practice of utilising forestry as a means of managing marginal land holdings and will withdraw from this activity in the most expeditious way that minimises costs to Council (such as ETS obligations to pay carbon credits for deforestation). Ultimately this will see the land converted to other purposes and/or on leased/ sold (land/forest).

As most of the forests are situated on Crown reserves, disposal will need to follow the revocation procedures under the Reserves Act 1977 and obtain approval by the Department of Conservation.

In order to avoid or reduce carbon unit payments for deforested land it has been more cost effective and practical to re-stock land prior to disposal. This is likely to improve the saleability and financial return for some blocks. Further, the Council will continue to provide supporting assets (fences, gates, signs) into the foreseeable future, while the land is in Council ownership.

Opportunities may exist to lease land at market rental as a means of managing redundant land previously utilised for forestry, should Council wish to retain ownership of land for future purpose.

Objective	Planned LOS	Performance Measure	Core Value						Current Performance	Target Performance			Indicative Performance Yrs. 4-10
			Quality	Customer Satisfaction	Availability	Quantity	Responsive-ness	Affordability		Yr. 1	Yr. 2	Yr. 3	
Forestry													
Forestry enables sustainable management of Council land that would otherwise be unproductive with a modest return	Forestry is used as a land management tool for sites that are limited in other productive uses	Area of land in forestry (hectares planted)				X			102.5	105	≥108	≥108	≥98
	Forestry provides an acceptable economic return	The annual revenue received (if any) is greater than the cost of sales						X	Nil sales	Nil sales	Nil sales	Rev.> sales cost	Rev.> sales cost
Forestry has positive environmental benefits in terms of reducing carbon emissions and soil erosion Forestry contributes to the rural character of the district	Forests are managed to conform with pest management requirements	Number of notices of action served by ECan for weed control per annum	X						Nil	Nil	Nil	Nil	Nil

Table 16-4: Forestry Present & Future LOS

16.3.6 Asset Performance

Historical Level of Service Performance

Specific performance related to level of service targets set in the 2018 Activity Management Plan is disclosed in the following table. This indicates that the target set for land in forestry has not been met over the last two years because of the harvesting programme following the wind storm in 2013. This has also had the effect of increasing the revenue from log sales with a corresponding excess in revenue compared with sales (harvest) costs.

Target LOS	Performance Measures	Target 2017/18	Actual 2017/18	Target 2018/19	Actual 2018/19	Target 2019/20	Actual 2019/20
Forestry is used as a land management tool for sites that are limited in other productive uses	Area of land in forestry (hectares planted)	≥70	55.6	≥80	95.7	≥90	96.8
Forestry provides an acceptable economic return	The annual revenue received (if any) is greater than the cost of sales	Rev.> sales cost	Nil revenue from tree sales	Rev.> sales cost	Net Rev= $238,428 less Sales Cost	Rev.> sales cost	Net Rev= $17,894 less Sales Cost
Forests are managed to conform with pest management requirements	Number of notices of action served by ECan for weed control per annum	Nil	0	Nil	0	Nil	0

Table 16-5: Forestry LOS Historical Performance

Stand History and Silviculture

There are no formal stand records for the Selwyn District Council plantations. Information for crop types was derived during a plantation survey in 1998 by Brailsford Forest Management. Stand records have been formalised and new stand data collected from immature plantations and added to this database.

Forest Growth

Site productivity and therefore yields vary across the district. Drier plains sites with light soils generally have poor growth rates. However where rainfall is greater and/or soils heavier site productivity increases. Site indices vary from 18 metres near the coast to 30 metres on the best sheltered foothill sites.

Crop Types

Crop types reflect the general quality of the stands and estimated yields. The quality/yields are affected by:

- Site soil and climatic conditions
- Silviculture practice (pruning and thinning regimes)
- Tending and releasing programmes
- Effects of weather events (wind throw etc.)
- Weed competition
- Animal pest damage

All stands have inventory data collected during quality control operations when tending is carried out. Information such as stocking, mean top height, mean diameter at breast height and pruning quality is collected. This stand data is used to determine which crop type should be assigned to a stand.

Plantations have been aggregated according to species, stocking site productivity and prune height. The crop types used are set out in the table below.

Crop type	Species	Stocking stems/ha	Site Index (m)	Harvest Age	Log Grade m^3/ha						Total m^3/ha
					S30	S20	KS Export	KI Export	Post	Chip	
R17M	Radiata	>800	<19.5	27	10	35	55	10	45	160	315
R18T	Radiata	<800	<19.5	27	20	35	35	60	20	130	300
R20T	Radiata		19.5 to 22.5	27	35	60	55	90	20	130	390
R24T	Radiata		>22.5	27	45	70	80	120	25	150	490

Table 16-6: Forestry Crop Types

The distribution of crop types in SDC plantations is shown in the figure below.

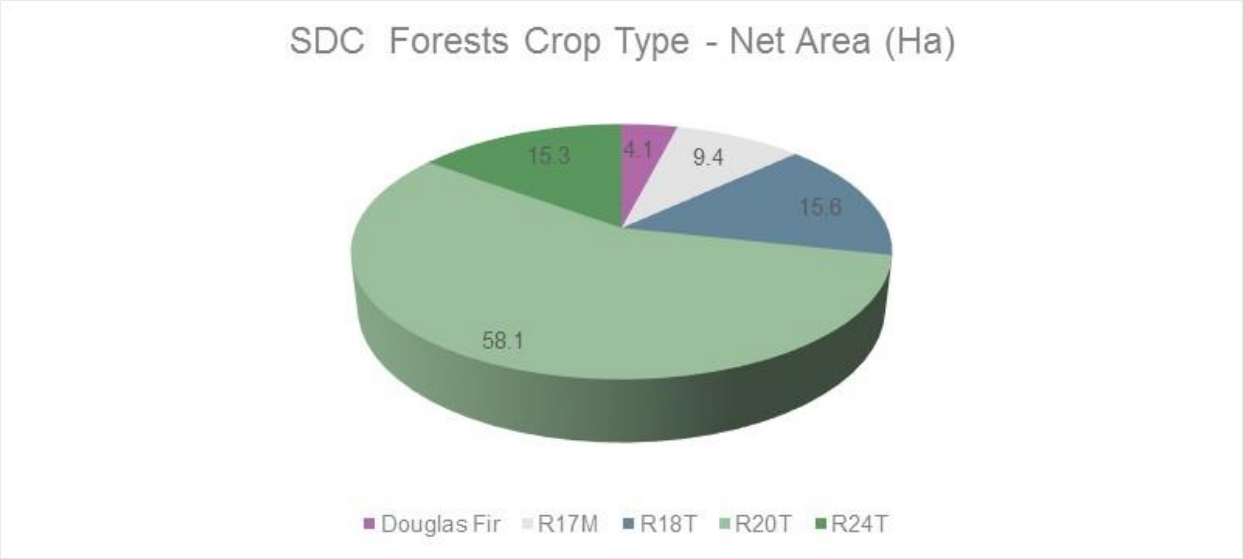


Figure 16-1: Forestry Crop Type Distribution

This information indicates that the quality grade is variable and performance in terms of production yields and returns will be correspondingly uneven.

Site Indices

Each forestry site is assigned a Site Index which represents the estimated "Mean Top Height" of Radiata Pine at age 20 years. Site Index is a measure of site productivity. This dictates the log grades that can be achieved on the sites and the management regimes. A breakdown of the site indices is shown in the table below.

Site Index Range (m)	% of sites
< 19.5	30%
19.5 – 22.5	30%
> 22.5	40%

Table 16-7: Forestry Site Indices

Fencing Performance

Preventing stock from entering forest plantations is necessary to ensure crops are not damaged especially during the establishment phase. Extensive repairs to fences have been undertaken following damage as a result of wind felled trees in 2013. Fences have been checked as part of condition inspections to ascertain whether they are stock proof. Data shows that >95 % of fences are stock proof.

16.3.7 Level of Service Changes and Issues

Due to trending poor financial returns and the wind storm events in 2013 and considerable damage to Council's forestry assets, a decision to implement a phased withdrawal from this activity means the general levels of service have changed.

The Council has previously utilised forestry principally as a means of managing redundant land that it owns or controls in a sustainable manner. With forestry no longer a viable option, emphasis will shift to maintaining harvested sites in a tidy state until a decision is made on their future use, whether this is to utilise for alternative purposes (native planting or recreation), lease or disposal. Most of the sites are situated on Crown reserves that cannot be easily disposed of and will need to follow the revocation process under the Reserves Act which may take a period of time.

To maximise Councils return on investment, it may be more effective and practical to restock land prior to disposal. This may also improve the saleability and financial return for some blocks.

Planned withdrawal from forestry will involve land use assessment on a block by block basis to determine the best long term outcome for each site based on analysis of potential issues, identification of limitations and cost implications.

16.4 Growth and Demand

This section covers the growth and demand implications for forestry. This includes an assessment of the demand influences and how these will impact on the future SDC forestry operations.

Due to the intended withdrawal from direct Council involvement in productive forestry, no growth is envisaged for this activity. Instead Council will implement measures to expedite withdrawal from the activity, minimising costs to Council.

This section will instead provide commentary on the infrastructure required to maintain the level of service until such time as the Council has withdrawn completely from productive forestry operations.

16.4.1 Demand Influences and Impacts

Demand implications for forestry now relate to Councils approach to expediting their withdrawal from the Forestry Activity whilst maintaining sites in a tidy and safe state until the point of change of use. Key challenges that have influenced Councils decision to take this approach are:

- **Forestry Management:** The dispersed nature of the sites (many small sites) and the relatively low productivity on plains locations means that forestry is a marginal activity from an economic perspective and needs to provide other significant benefits to warrant continued investment. The objective is to provide minimum inputs to reduce costs but this does not lead to quality forestry operations.

- **Maintenance and Operations**: Whether forested or not there will still be costs incurred for looking after the sites (until they can be sold, leased or converted to an alternative use). This includes noxious pest and weed control, rubbish removal, fencing repairs and roadside maintenance.

- **ETS Liabilities:** Deforestation (land not replanted after 4 years from harvest) will incur carbon unit costs. Based on the current area of un-stocked land Council could have carbon unit costs of $480,000 and, based on land de-stocked since 2013 has immediate liabilities of $204,000. If carbon unit liabilities are not paid then penalties for non-payment can be applied. Council can avoid or reduce these liabilities by re-stocking the land. The cost of replanting is likely to be significantly less than current carbon unit costs.

- **Withdrawal from Forestry Activities:** As noted Council will incur carbon unit costs if deforested land is not re-stocked with forest species or native plants that can attain forest cover. This presents a challenge in regard to the preferred option to withdraw from forestry activities whereby significant costs could be incurred (over $1 million if all current forestry blocks are deforested over time). Therefore, replanting is proposed to avoid/reduce carbon costs but with the notion of on-selling forested land once the reserve status has been removed and potentially retaining some sites that have a continued amenity or other purpose as afforested blocks.

- **Land and Forest Disposal:** It is proposed to follow the same reserve disposal process as with Gravel Reserves for forestry sites where this is applicable. This process is likely to take some years to complete given the various requirements under the Reserves Act and the DoC procedures. There are some sites (around 40 ha) that cannot be sold as they are on legal road, cemetery land or have other constraints. In these cases it is proposed to replant them in either forest or native species.

Log Market

Selwyn District Council plantations are in the heart of the Canterbury region. The log market in Canterbury is characterised by a number of features. A well-developed sawmilling industry is present with a number of medium sized sawmills mainly in and around Christchurch. Log grades uplifted by these mills included pruned saw logs, S30 and S20 saw logs. The principle timber markets for these mills are the domestic market and Australia. The plywood mill at Greymouth (International Panel & Lumber) purchase higher grade logs, both pruned and unpruned, from the Canterbury region. Smaller industrial logs are processed locally by Shands Road Sawmill.

The most significant demand for logs unsuitable for sawmilling comes from the Medium Density Fibreboard (MDF) plant at Sefton, this plant utilises both chip logs and slab wood chip from sawmills. Firewood processes are the other major chip log customers in the region. The robust agricultural sector of Canterbury provides good demand for posts with a number treatment plants in the region. The local wood processing industry generally provides a relatively stable market for the higher quality logs produced from the Council's forests.

For the last thirty or more years regular shipments of export logs have been shipped from Canterbury. This trade was initiated when Rayonier New Zealand entered the Canterbury market. Logs have been exported from both the Port of Timaru and Lyttelton. The export market takes various species which suits the Council forest estate. With some exceptions the log export trade has mainly provided an outlet for lower grade and short logs (3.7-4.1m), including saw log grades (A, K & KI) and pulp quality logs (KIS & KX). The log export market tends to be more erratic than the domestic market with factors such as the exchange rate and shipping costs making them difficult to predict.

Log Prices

Export log markets over the 2016/17 financial year started at an above average level having dropped from a 20 year high in April. Prices have generally been increasing during the financial year with a larger increase in January 2017. The US$ has had a weakening trend through the year although has strengthened at the end of the period and shipping rates have been trending upwards during the period.

Domestic saw log prices have again been relatively stable with good demand for all wood products due to the Christchurch rebuild, new home building in Auckland and other growth areas. A constrained log supply due to favourable export prices has kept log prices firm. Prices for the predominant log types – Radiata pine and Douglas fir - are derived from the AgriHQ prices and adjusted according to current log sales from the Council. Other prices are taken from historic sale data or are related to the AgriHQ prices. See appendix three for more details. Radiata Pine gross log prices have decreased by 6.8%.

Table 16-8 below shows the log prices as at June 2020.

Log Type	Delivered Price
Radiata Pine	
S30 saw logs	$123.00
S20 saw logs	$108.00
KS export	$101.00
KI-grade	$94.00
Posts	$81.00
Chip logs	$57.00

Table 16-8: Forestry Log Prices

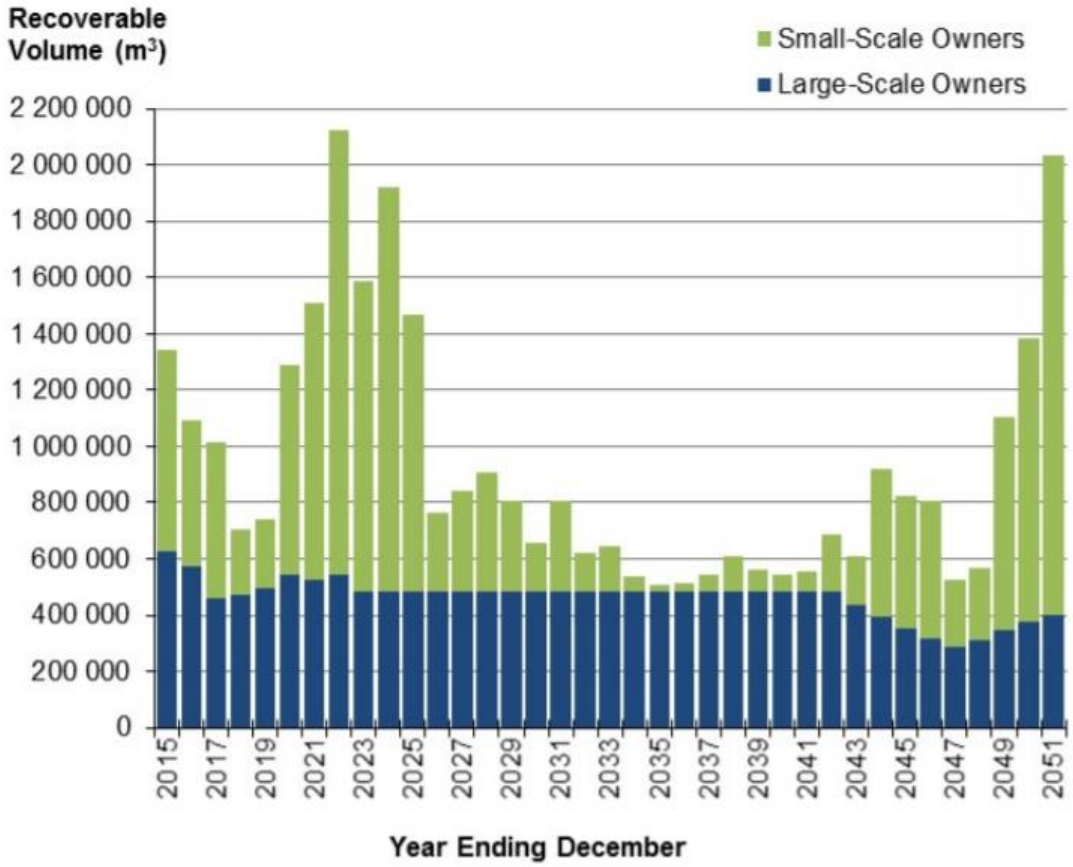


Figure 16-2 below depicts the 40 year scenario for radiata pine availability for Canterbury based on all trees harvested at 28 years. This indicates there will be a peak in logs on the market between 2021 and 2025 which may have an impact on demand/supply and prices.

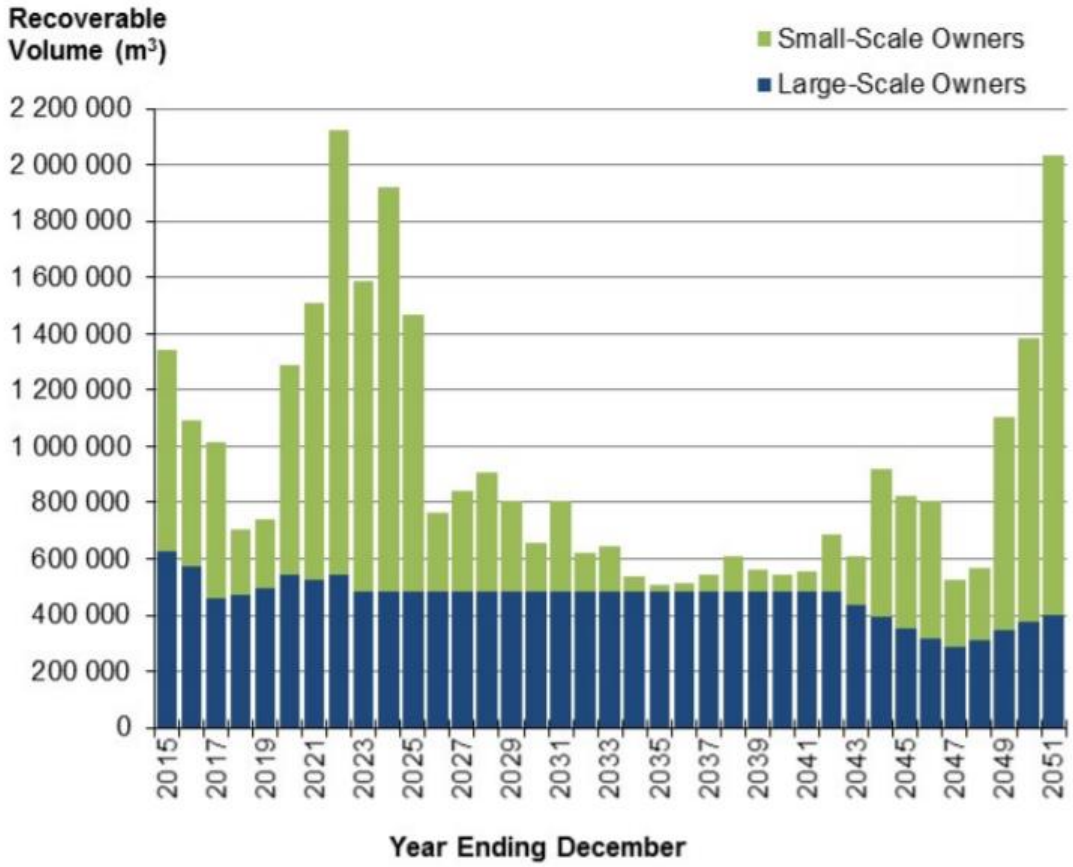


Figure 16-2: Domestic Canterbury radiata pine availability (all trees harvested at age 28) - source: file:///C:/Users/chmaf0/Downloads/Wood-Availability-Forecast-Canterbury-2015.pdf

Forestry Costs

Costs for all forestry operations are able to be kept relatively low due to the mainly flat sites that are easy to access for silviculture, tending and harvesting work. The small area of many of the sites means that cost per hectare is slightly higher than larger plantations. Forest management costs, including overheads have tended to gradually increase over time and this trend is expected to continue.

One Billion Trees Programme

The Government has developed the One Billion Trees Programme to increase tree planting across New Zealand. The goal is to double the current planting rate to reach one billion trees planted by 2028. The programme has the potential to deliver huge benefits for the environment, people, communities, and economy. The focus is on making it easier to plant the right tree, in the right place, for the right purpose.

Direct Grants from the One Billion Trees Fund are available to landowners, including private landowners, farmers and Māori landowners, to help with the costs of planting trees or assisting reversion to native forest. Applications can be submitted year-round.

Because Council is going to reduce its forestry holdings, it has not sought a grant from this fund for production forestry.

Surplus Council Land

The Council has identified land holdings (including reserves) that were surplus to requirements. A number of these sites were old gravel reserves some of which are currently used for forestry operations. Those currently used for forestry were generally excluded from disposal consideration. This report identified benefits in terms of sustainable and productive land use and long term return on investment.

However, because forestry is no longer considered a viable means of land management, Council will consider disposal of land previously used for forestry that is surplus to requirements, if the benefits were sufficient to warrant that action (e.g. high land price, potential for other more economic use). This will follow a similar process as undertaken with a number of gravel reserves that have recently been approved for disposal. The process involves land assessment, revocation of reserve status (where applicable) and hand over to the Department of Conservation to action disposal (where the land is derived from the Crown).

NZ Emission Trading Scheme (NZ ETS)

The NZ ETS was first legislated in the Climate Change Response (Emissions Trading) Amendment Act 2008 in September 2008 with subsequent amendments in 2009, 2012 and 2020. The NZ ETS covers forestry as a net carbon sink. In 2012 Selwyn District Council made an application pursuant to the pre-1990 forest land allocation plan to the (then) Ministry of Agriculture and Forestry for an entitlement of NZ units. The determination at that time was based on an eligible forest area of 108 ha and a total of 6,480 NZUs were allocated on this basis.

Council did not have sufficient post-1989 forest to make it worthwhile to make an application for NZUs for this forest type.

Where pre-1990 forest land is deforested, the landowner becomes a mandatory participant in the ETS and must pay units for the carbon emitted, unless the deforestation occurs on exempt land or is offset. The landowner must formally notify the Ministry for Primary Industries (MPI) when they begin to deforest, and submit an associated emission return.

When land is temporarily de-stocked it will be classified as deforested if it does not meet certain criteria and of specific note is the requirement, within four years after felling, for land to be replanted with at least 500 stems per ha of forest species or have regenerated 500 stems per ha of exotic forest species (there are other criteria which would generally not apply with SDC plantations).

Council had to prematurely harvest or clear crops as a result of the 2013 wind storm events which led to many sites being de-stocked. In order to avoid having to pay for the loss of ETS credits from de-stocking many of the sites have now been replanted (102.5 ha at December 2020). There are few additional sites to be replanted that will recover the full initial stocked area of 108 ha.

This process forms part of the strategy to re-stock land prior to disposal. There are a number of sites equating to a total area of 39 ha that were previously used for forestry and remain unstocked or converted to an alternative use.

National Environmental Standard for Plantation Forestry

The National Environmental Standard for Plantation Forestry (NES-PF) applies to any forest of at least 1 hectare that has been planted specifically for commercial purposes and will be harvested (applicable to many of Councils forestry assets). Its objectives are to maintain or improve the outcomes and increase the efficiency and certainty, of managing plantation forestry activities.

The NES-PF is achieved through a series of regulations under the Resource Management Act 1991. Where risks of harm to the environment are high or if a forest operator can't meet the regulatory requirements of a permitted activity, the operator will require resource consent.

The Standards commenced on the 1st May 2018. At that point the Operative District Plan provisions for plantation forestry were no longer binding, and the District Plan has been amended accordingly.

During the re-stocking programme for forest sites cognisance of rules pertaining to forestry have been taken into account including proximity to paved roads (where shading could be an issue) and setbacks from adjoining property boundaries.

Climate Change

Forestry has the capability to reduce the effects on climate change by converting carbon emissions into trees as well as producing associated positive environmental benefits.

Council's decision to withdraw from forestry as a means of land management on unproductive sites may reduce the overall carbon sink provided on Council land but it is likely that a substantial portion of the land will be reforested or converted to native planting areas (where this is feasible).

The predicted effects including extreme weather events (drought and wind) may mean that some forestry areas may not be sustainable with the current cropping regimes and different land management approaches may be required for these sites. There is also the likelihood of increased fire risk for forestry and actions will be required to reduce the risk.

16.4.2 Asset Capacity

Land Utilisation

The proportion of land used for forestry production compared with the total area of land available for this purpose provides an indication of the level of utilisation. This will fluctuate depending on timing of harvest and replanting programmes and will gradually reduce as Council withdraws from forestry operations.

A portion of the land available will not be able to be planted due to site constraints (old pit areas) and to maintain fire breaks and access. Current land utilisation along with previous years is depicted in the graph below. Council's decision to not replant some sites following harvest initially led to a decrease in the level of utilisation but this has now increased as a result of the re-stocking programme. However this will ultimately reduce over time as forest areas are sold or used for an alternative purpose.

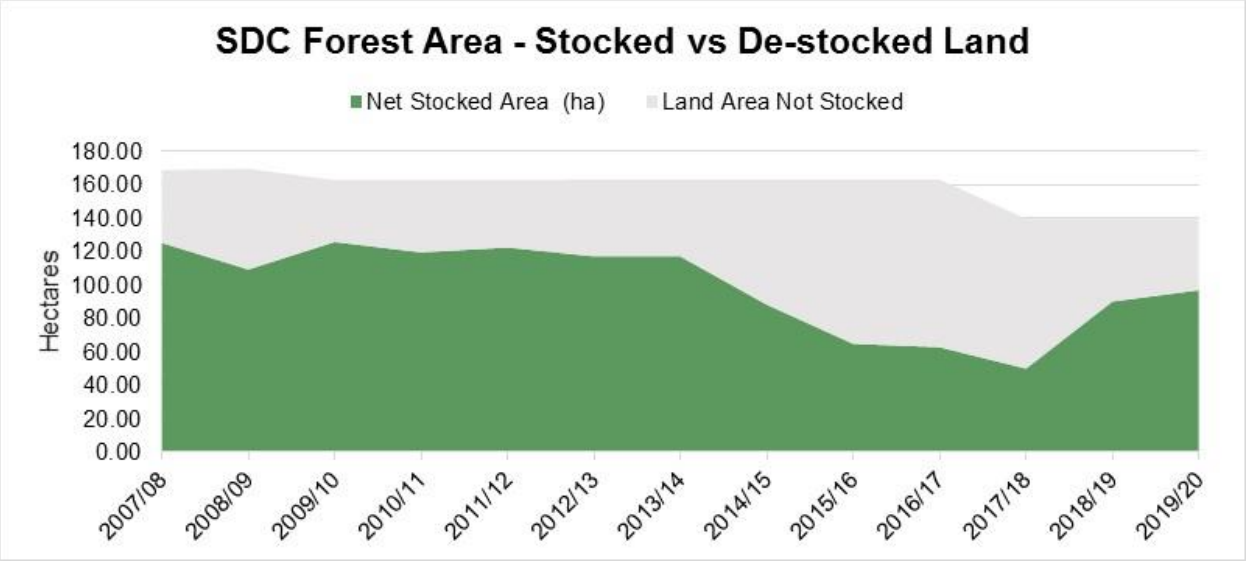


Figure 16-3: Forestry Land Utilisation

16.4.3 Demand Management

Demand management involves the use of intervention strategies to influence demand for services or assets to promote more sustainable outcomes. With forestry there are a number of demand management approaches available. As forestry is principally a land use activity, Council can manage the supply of land provided. The future of each site will be considered on a site by site basis, considering the key factors (economic, environmental, social and cultural) to determine the most sustainable future direction. Demand (use of land for forestry) is expected to decrease as a result of this assessment and Council's decision to withdraw from forestry activities over time.

The District Plan requirements have the effect of managing demand for forestry by not permitting it to occur in some areas (e.g. Outstanding Natural Landscapes) and providing activity controls. As mentioned previously the NES-PF which came into effect on the 1st May 2018, provides further direction for the future management of plantation forestry and has superseded the current provisions of the District Plan.

16.4.4 Meeting Demand through Asset Growth

Council is withdrawing from direct involvement in productive forestry over time. No growth is therefore envisaged for this activity apart from some replanting of de-stocked land. Instead Council will progressively implement measures to ensure a phased withdrawal from the activity.

The strategy for withdrawal involved re-stocking some land with forest species to meet ETS obligations and, therefore, a short term expansion of the forest area has resulted. However, as sites are on-sold or converted to other uses such as native planting, the overall forest asset will reduce.

The forestry aspects of McHughs Plantation in Darfield will continue to be managed alongside other district forests but its primary purpose is for recreational use. Forestry operations will need to be managed to accommodate this use and the future sustainability of the forest.

16.5 Managing Assets

This section explains how the SDC forests are managed and operational services delivered.

16.5.1 Management Strategy

Overall administration of SDC plantations is undertaken by the Council's Property Group. The Reserves Operations team provides the day to day maintenance functions which are required. The management of the forest assets is provided via a contract agreement with a Consultant Forestry Advisor which is currently Ashburton District Council. The consultant provides professional services including:

- Valuations
- Log marketing advice
- Provision of long term planning and cash flows
- On job supervision of specialist forestry contractors
- Auditing of harvesting work

The primary objective of the Council's forestry operation until it completely phases out of this activity, is to provide sustainable land use and weed suppression on sites that would otherwise be unproductive. This outcome requires the use of sound establishment practices to provide the vigour that will suppress weed growth and employment of a conservative silviculture regime that minimises the potential of crop losses through wind damage or fire.

The secondary objective "to maximise financial returns" can be achieved by the following mechanisms:

- Maximise sales income – this will be constrained by the fact that conservative silvicultural regimes are required to satisfy the primary objective
- Minimise costs – to achieve successful establishment and to maximise sales income a reasonable level of expenditure is required
- Keep rotation length as short as practical, this is constrained by timber quality and log size factors as the value of small immature logs is limited

16.5.2 Managing Withdrawal from Forestry Activities

Given the key challenges with Council's forestry operation and, more specifically, the low returns, relatively high cost of ownership and the risk of loss from wind events there was a need to reflect on the future direction for this activity.

In considering this matter Council assessed a number of options from incremental withdrawal as forests are harvested to continued investment in the forestry activity involving replanting of all forest land.

Having considered all practical options Council has indicated a preference for withdrawal from forestry operations in the most cost effective way. This involves a combination of approaches based on the best future use of the land and includes:

- Retention of some forestry on land that cannot be readily sold (Cemeteries, road reserves etc.)
- Disposal of forested land (some as replanted forest)
- Replanting of sites in native species
- Leasing of land for alternative purposes such as grazing if it is not suitable for replanting (with conversion to pasture)

In terms of management and cost implications this combination of approaches involves:

- Evaluation of each site against a set of criteria to determine the best future use
- Replanting of de-forested land (that is suitable for future forestry)
- Remediation of land prior to planting and for sites that will be used for an alternative purpose
- Initiation of reserve/land disposal actions (assessment, revocation etc.)
- Re-calculation of ETS carbon unit obligations (if any)

16.6 Forestry Assets

This section covers a description of the Council's forestry assets including information on the forests and the supporting infrastructure.

16.6.1 Asset Description

Location and Area

The Council has a total of 55 sites distributed throughout the district that are currently utilised for forestry purposes. These vary in size from almost 10 hectares down to less than 0.5 hectares. The total area of land utilised for afforestation purposes is 122.2 hectares. Currently only 102.5 hectares is planted in forest.

The Council has ownership of all its plantations, land and trees, however in a few instances the plantations are endowed to other organisations (e.g. schools).

Council plantations are well located to potential log markets, these include numerous sawmills in Christchurch, and the ports of Lyttelton and Timaru. Refer to the location map in Annex 16B for details on actual forest locations.

Site Characteristics

Council's plantations are all located on the plains within the Selwyn District with the exception of one plantation in the Malvern Hills. Most plantations are on relatively flat plains sites. Soil types of plantations on the plains are commonly shallow, infertile and stony. Rainfall that plantations receive varies from those near the coast, 600 mm/year, to those near the foothills, up to 1000 mm/year. Most sites have endemic weed problems; the main species are broom, blackberry, gorse and a range of exotic grasses.

Plantations are commonly adjacent to roads and therefore do not present access problems for management, harvesting and planting.

Forest Tree Species

Canterbury's climate of strong winds, dry summers and cool winters limit the species suitable for planting. Plains sites are generally most suited to Radiata pine with Douglas fir an option for those plantations closer to the foothills (higher rainfall). The current species distribution is shown in the figure below which indicates a predominance of Radiata pine.

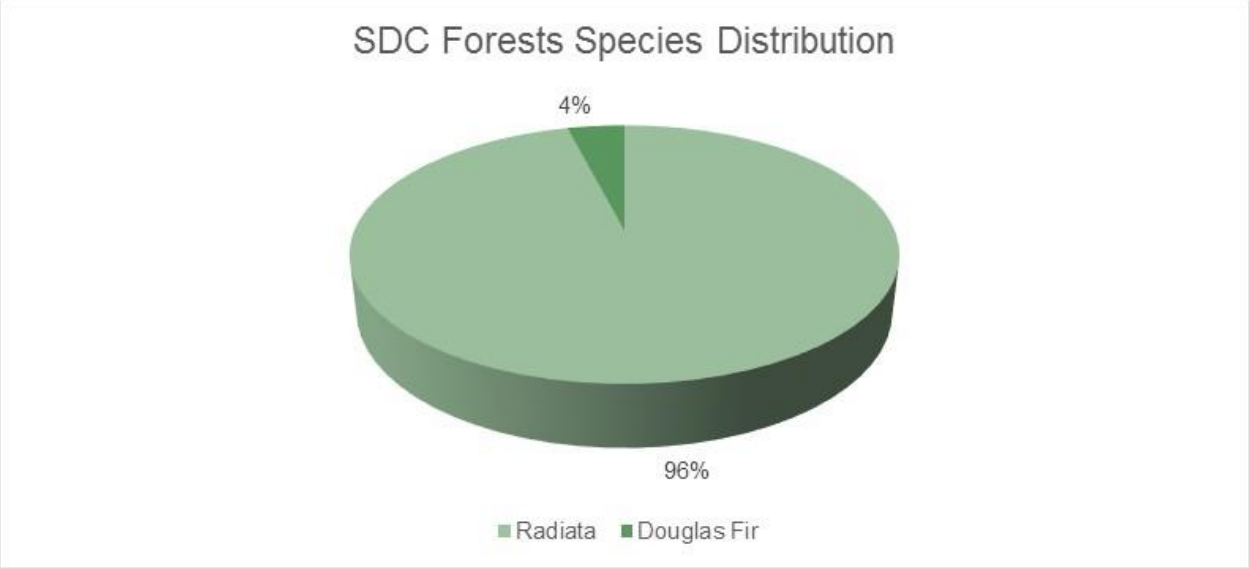


Figure 16-4: SDC Forest Species Distribution

The Council's plantation resource has a fragmented age class structure which will have been affected by wind-throw events. It also reflects the amalgam of small sites that comprise the forest resource and the management and planting regimes of the different authorities that formed Selwyn District Council in 1989.

The graph below shows the current age class distribution of the Council's Radiata pine resource. The uneven age class means that there will be peaks and troughs for harvest times and revenue streams. It indicates that over 40% of the crop is recently planted (0-5 year's age) as a result of the re-stocking programme.

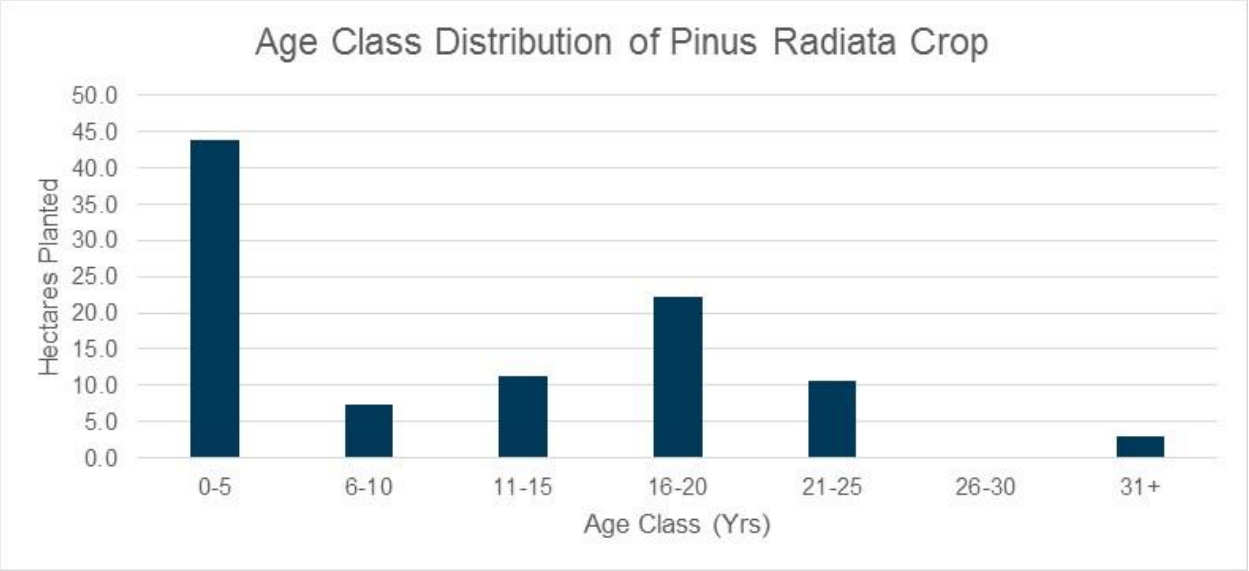


Figure 16-5: Age Class Distribution of Pinus Radiata

Supporting Assets

There are few infrastructure assets required to support the forestry operation. The main assets are fences and there are also a number of gates and signs located on forestry areas. A summary of fence assets is presented in Table 16-9.

Asset Element	Sub-Element	Quantity (Lineal metres)
Fences	Deer	1,162
Fences	Electric	561
Fences	Post/wire	18,626
Fences	Post/netting	15,312
Total		**35,661**

Table 16-9: Forestry Fence Assets

Forestry Valuation

A valuation of the forestry estate has been calculated as at 30 June 2020. This valuation includes all the plantations owned by the SDC.

This forest valuation has followed the procedures set out in accounting standard IPSAS 27 Agriculture (IFRS) and the "Forest Valuation Standards", NZ Institute of Forestry - May 1999. The Net Present Value (NPV) method was used in conjunction with transaction evidence.

The total value of the forest crop is set out in the table below (Radiata pine only). The estate valuation has decreased from the 2019 year's valuation of $247,126. The decrease in the valuation is principally the result of harvesting mature stands.

Crop Type	2020 Area (ha)	2020 Value ($)
R18T	39.1	$92,469
R17M	8.1	$12,068
R20T	26.2	$33,597
R24T	23.4	$74,898
Total	**96.8**	**$213,032**

Table 16-10: Forestry Valuation Summary

16.6.2 Asset Condition

Asset condition for the forests is generally expressed in terms of the crop type which represents the quality of the stand and potential yields. This information is presented in section 16.3.6 on asset performance.

Information on the condition of fences on forestry sites has been collated and is shown in summary form in the following graph.

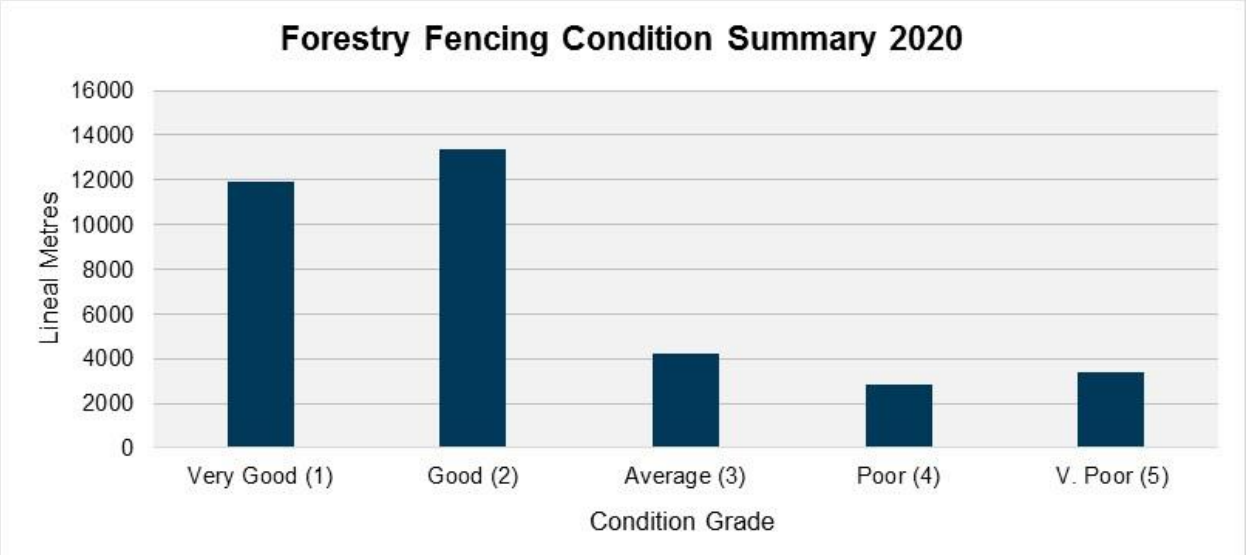


Figure 16-6: Forestry Fences Condition Summary

This indicates that around 17% of fencing is in poor or very poor condition and will need to be renewed or rehabilitated over the next few years. In most cases this will occur as part of annual maintenance programmes on a priority basis. Many of the fences are mutual boundary fences that will require negotiation and agreement with neighbouring property owners prior to work being undertaken.

Overall around 70% of fences are on good or very good condition which has been, in part, a result of fencing replacement work undertaken after the wind storm and to protect replanted sites. The overall condition of fencing has, therefore, generally improved.

16.6.3 Operations and Maintenance

Operations

The operations activities undertaken in managing SDC forests is outlined in the table below. These are essentially operational inspections at critical times during the tree production life cycle. For each operation performed in the Council's plantations quality performance checks are carried out as part of the supervision. Operational works are generally arranged through the Council's Forestry Consultant who has the expertise and industry contacts.

Activity	Work Details	Performance Check
Land Preparation	Aerial pre-plant spraying	Visual inspection of % kill & drift issues
	Windrowing	Visual inspections to ensure site clearance is achieved
	Deep ripping	Average distance between rips should be within 7.5% of specified spacing
Planting	Seedlings purchase	Measure sample of tree stocks (0.5%) against specification
	Plant seedlings	Check quality control plots (2%) of plantation and apply demerit system
	Plant survival	Survey in Feb. after planting – survival should be >85%
Releasing	Release spraying	Checked with visual inspections
Thinning and Pruning	Thinning and Pruning	Check quality control plots against specification (2% of plantation) – rework required when >10% difference from specification
Harvesting	Pre-harvest inventory	Complete six months prior to harvest using MARVL inventory method
	Cut over	Inspections once per month (minimum two) -all saleable material to be marked and measured

Table 16-11: Forestry Operations

Maintenance

To maximise the profitability of the Council's forestry operation it is essential to employ the best possible maintenance practices. All phases of forest management; establishment, tending and harvesting, will affect profitability.

Training and safety

It is important to employ well trained and experienced contractors. All contractors working for the Council should be aware of their obligations under the Health and Safety at Work Act 2015 and should be part of an ongoing training programme. All contractors working for the Council will be required to submit their safety plan and undertake hazard identification where appropriate. Safety audits will be part of the supervision of operations.

Establishment

Forest establishment covers the period during which land preparation, planting and releasing is carried out. Forest establishment operations should be aimed at establishing a uniform crop of trees as quickly as possible. Establishment includes:

- Mechanical and/or chemical preparation of the land
- Pest control – carry out an assessment of the pest population the autumn before planting and identify control measures;
- Livestock trespass – check boundary fences and repair where necessary
- Planting – best possible planting methods should be employed to ensure tree survival. Hand planting, or machine planting can be used. Only high quality tree stocks should be planted. (Radiata pine the minimum acceptable "Growth & Form" rating is GF16 or above)
- Releasing – weed vegetation will suppress seedling growth unless it is controlled by releasing. It is recommended that plantations are broadcast released to ensure successful crop establishment

Fertiliser

Canterbury soils are recognised to be deficient in boron which causes leader die-back and is also thought to contribute to the formation of resin pockets, a timber defect. All plantations should therefore have boron fertiliser applied.

Tending

The tending or silvicultural phase of the tree crop is when thinning and/or pruning is carried out. The type of operations employed and their timing will help determine the log types produced. As each species is suited to different product types, different tending regimes are employed for each.
The regimes for the major species are outlined in the following series of tables.

Radiata Pine Framing Regime	
Site Type:	Poor form/low productivity
Year/MTH	Operation
0	Plant 1250 stems/ha (4x2m) Release Spray
1	Release spray (if necessary)
3	Boron fertiliser
9.0m	Prune edge trees to 4.5m
9.0m	Thin to waste 550-600 stems/ha *
25-30	Clear-fell

Table 16-12: Radiata Pine Framing Regime

Radiata Pine Clear wood Regime	
Site Type	More productive sites
Year/MTH	Operation
0	Plant 1250 stems/ha (4x2m) Release Spray
1	Release spray (if necessary)
3	Boron fertiliser
6.0m	Prune 400 stems/ha to 2.5m Thin to waste 400 stems/ha
8.5m	Prune 400 sph to 5.0m
10.5m	Prune 300sph to 6.5m (SI >28m)
28-30	Clear-fell

Table 16-13: Radiata Pine Clear wood Regime

Douglas Fir Single Thin Regime	
Site Type	Windy, steep, higher rainfall
Year/MTH	Operation
0	Plant 1333 stems/ha (3X2.5m) Release Spray
1	Release spray
2	Release spray (if necessary)
12.0m	Thin to waste to 550 stems/ha
40-45	Clear-fell

Table 16-14: Douglas Fir Single Thin Regime

Harvesting – Inventories are prepared to provide information to schedule harvesting for optimal times. Harvesting is generally undertaken by specialist logging contractors. Traffic management plans will be required during harvest operations.

General Maintenance – Includes perimeter spraying to keep boundaries and fence lines clear of brush weeds, maintenance and replacement of boundary fences, cleaning water races, repairs associated with fallen trees, and firebreak clearance.

Maintenance Inspections – Inspections are undertaken at least once every three years. This inspection identifies perimeter spraying requirements, fencing work, pest control and any other maintenance work.

Operations and Maintenance Issues Identified

Specific maintenance and operating issues that have been defined and the Council's management response is set out in the following table

Issue	SDC Response
Controlling noxious weeds on forestry sites	· An annual spraying programme is undertaken based on priority sites identified during maintenance inspections · The budget has been increased since 2018 and extra budget provided for plant releasing to aid replanting establishment
Illegal dumping of rubbish in forestry plantations	· Rubbish is removed as soon as it has been reported · Signs are installed on problem sites warning of prosecution · Fences and gates maintained to deter access
Maintenance of road frontages	· Road side grazing arrangements where this is practical · Mowing to "rough" standard where required · Some removal of trees/vegetation to improve traffic sigh lines
Maintaining stock proof fences	· Reactive repairs & renewal at time of replanting if required · Work with neighbouring property owners
Land remediation requirements	· A total of $25,000 is budgeted over 2022/23 and 2023/24 to compete works

Table 16-15: SDC Forestry Operations & Maintenance Issues

Historical Operations and Maintenance Costs

A summary of historical operations and maintenance costs for forestry for the last five years is presented in the graph below. Forestry costs will fluctuate from year to year depending on the timing of harvesting and programmes for rehabilitation of land. The higher costs for routine operations and maintenance costs in 2018/19 related to ground preparation for replanting.

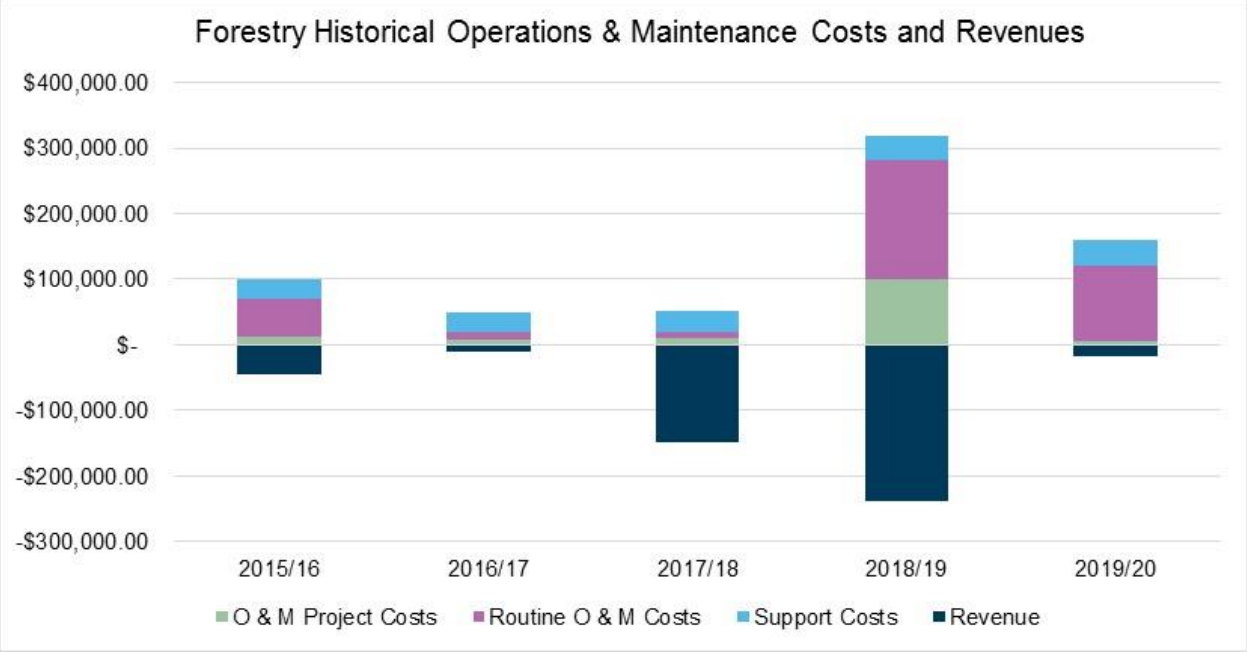


Figure 16-7: Forestry Historical Operational Expenditure

16.6.4 Asset Renewal

Renewal of fences is generally undertaken through incremental repairs as part of annual maintenance programmes. As a result of damage incurred during the wind storms in 2013 and wind felled trees, a number of additional repairs/replacement were necessary to forestry fencing assets. This improved the overall condition of fences. There are no recognised capital assets renewals associated with this activity and assets are not depreciated.

16.6.5 New Asset Requirements

There are no planned new capital assets related to the forestry activity.

16.6.6 Disposal Plan

Log Sales

Forest asset trees are disposed of in accordance with the 20 year harvest plan. Market prices for logs based on grade values are obtained at the time of sale. The aggregation of groups of plantations for sale is undertaken where possible to increase the volume being offered for tender as larger parcels of wood will attract more buyer interest.

The normal method of sale is a stumpage tender using an aggregate price, this method sells all logs at a single per unit rate. Other methods maybe appropriate for particular plantations. For example a lump sum sale may appropriate for small blocks with a lower value where supervision costs would be expensive in proportion to stand value.

Forestry Land

Due to an intended withdrawal from direct Council involvement in productive forestry, Council will continue to investigate the future viability of land and options for disposal. There are a small number of sites previously identified a surplus as having some potential for sale (e.g. Butts plantation, Waterholes Road). As part of council's withdrawal an assessment will be made on site by site basis to determine viability of lease, sale or alternative use (i.e. recreation). No budget provision has been made under this activity for revenue from land sales and this will be covered under the property disposal programme in the Property and Buildings 10 year Plan.

Provision has been made for disposal of forests as part of land sales. The revenue is based on a value per hectare calculation derived from the current forestry valuation. It is estimated that between $13,650 and $19,500 per year will be produced in revenue from forest sales from 2027/28.

16.6.7 Risk Management

A risk assessment has been undertaken for forestry and this process has identified a number of key risks. Mitigation and action measures to address risks have also been determined. Risk mitigation measures have been built into maintenance and operational practices and inspections as required.

Management of risks to forestry assets (tree crops) is critical to ensure they are managed over their life span (generally 25-30 years) to obtain the best returns at the time of harvest. A summary of risks and the management approach is set out below.

Fire Prevention and Control

The Selwyn District Council is the rural fire authority responsible for controlling any fires in the Councils plantations. The major potential sources of fire in the Council plantations are from the following:

- Forestry operations within plantations
- From vehicles travelling on roads adjacent to plantations
- Neighbouring agricultural operations

To prevent fires during logging etc. contractors must reduce working hours in periods of very high fire risk and stop all forestry operations in periods of extreme fire risk. Contractors are required to carry firefighting equipment during the fire season and to have undergone firefighting training.

Most plantations are easily accessible from Council roads and many have water races nearby for firefighting. It critical is to have good liaison with neighbours to help prevent fires.

Fire insurance is held by Council and covers loss of the tree crop and firefighting expenses.

Disease and Insects

The Council plantations are in a region which suffers from few forest health problems. This is due to the relatively dry climate. Minor forest health issues that have shown up in the past are mid crown yellowing, Sphaeropis sapinea (initiated during drought conditions) and Woolly pine aphid.

There is always the potential for new pests and diseases to enter the country and the impact of these is not certain.

Grazing and Stock

It is imperative that areas that have been recently planted are "stock proof" fenced. Grazing is only considered in Council plantations when trees are not at any risk of stock damage with a minimum mean crop height of 4 metres before sheep can be introduced and 10 metres for cattle. Grazing can be used as a tool to reduce the level of weed infestation and to lessen the fire risk.

Pests

Rabbits and hares are the main feral animal threat to tree growth in the Councils plantations. Areas to be planted can be assessed by Environment Canterbury prior to planting. If pest numbers are significant, poisoning followed by night shooting is carried out before planting.

Climate Change and Extreme Weather Events

Extreme weather has the potential to cause damage to the tree crop. Wind damage is the most common threat to Council plantations. Wind damage can be reduced through good management techniques. Avoidance of late thinning helps to minimise wind damage. The Council's policy is not to thin Radiata pine with a mean top height of greater than 10 metres. It is noted that under predicted climate change scenarios for the Canterbury Plains there is a likelihood of more extreme weather events including wind storms. This is one of the reasons Council is considering a withdrawal from forestry crops on plains sites.

The other main weather event that is a potential risk to the tree crop is snow damage. Heavy snowfalls can cause significant damage to immature plantations through toppling, broken stems and branches. Douglas fir have previously been planted in high risk areas which can be defined as sites over 500 metres in altitude and hill sides with a north eastern aspect at high elevations (prone to snow drifting).

Markets

One of the greatest risks faced by forestry investors is the market. It is impossible to predict with certainty what log markets will be like in 25 years. To gauge the market, historical trends are examined as well as the log availability data produced by the Ministry of Agriculture and Forestry. These trends suggest log markets are likely to improve, real log prices increased on average by 2% per year over the last fifty years.

Exposure to market risk can be lessened by growing Douglas fir on appropriate sites. This strategy produces a variety of species and gives the Council more marketing options.

The Council endeavours to time its log sales activities where possible with favourable market conditions, this may involve bringing forward harvesting or delaying harvest.

Key Risks

A risk assessment has been undertaken for forestry and this process has identified a number of key risks. Mitigation and action measures to address risks have also been determined. Risk mitigation measures have been built into maintenance and operational practices and inspections as required.

Forestry assets have been assessed in terms of criticality (assets which have a high consequence of failure) and there are no specific assets within this service area that would be categorised as critical.

Refer to the Section 6: Risk Management for additional information on how risk is managed and significant risks related to this service area. Risk mitigation measures are incorporated into forward programmes as appropriate.

Insurance

Council holds insurance cover for forest crops and assets as follows:

- Fire - $1,566,717 (includes the assessed value of McHughs Plantation)
- Hail - $20,000
- Wind storm - $500,000
- Firefighting - $783,358
- Forestry infrastructure - $15,000
- Removal of debris - $15,000
- Replanting - $200,000
- Claims preparation costs - $6,000

16.6.8 Sustainable Management

As described in Chapter 17, Council is focussed on integrating more sustainable management approaches in to the way it works, manages assets and delivers services.

The Council's primary objective for its forestry operations has been to provide for sustainable management of land holdings that would otherwise be unproductive. The crop regimes are also aimed at sustainable land use rather than high productivity.

Forestry practices take account of the New Zealand Environmental Code of Practice for Plantation Forestry 2007 which provides best practice guidelines for forest management including protection of environmental and heritage values. This approach has been reinforced with the introduction of the National Environmental Standards for Plantation Forestry in May 2018.

The sustainable management approach for forestry is shown in the following table.

Wellbeing	Sustainable Approach
Environmental	Forestry planting is used as a land management tool to reduce other maintenance inputs and provide a financial return Crop regimes that provide for minimal maintenance requirements are used
Environmental	The forests contribute to a reduction in carbon emissions by acting as "carbon sinks", absorbing carbon (CO2) from the atmosphere
Environmental	Council forestry plantations help to reduce soil erosion and nutrient leaching
Environmental	Under-grazing by livestock where this is practical to reduce weed growth and add nutrients
Environmental	Have regard to New Zealand Environmental Code of Practice for Plantation Forestry 2007 and the National Environmental Standards for Plantation Forestry which provides best practice guidelines for forest management and protection of environmental values
Social	Forest areas contribute to the provision of passive recreation activities and can be developed for this purpose
Economic	Forestry provides a financial return to Council on land that cannot be used for other productive purposes
Economic	Forestry contributes to the local economy by providing work opportunities and generating business income
Economic	Endowment plantations provide financial support to local community organisations

Table 16-16: Forestry Sustainable Management

16.7 Financial Programmes

This section provides a summary of financial forecasts for forestry over the 10 year planning horizon. Additional detail on financial forecasts is contained in Annex 16C.

16.7.1 Historical Financial Performance

The following graph shows the financial performance for this activity over the last three years. Observations noted are:

- Revenues shown in 207/18. 2018/19 and 2019/20 all relate to log sales from unplanned harvesting of blocks
- The over-budget position for opex in 2018/19 is primarily due to a valuation write down of $63,843 and unplanned harvest costs

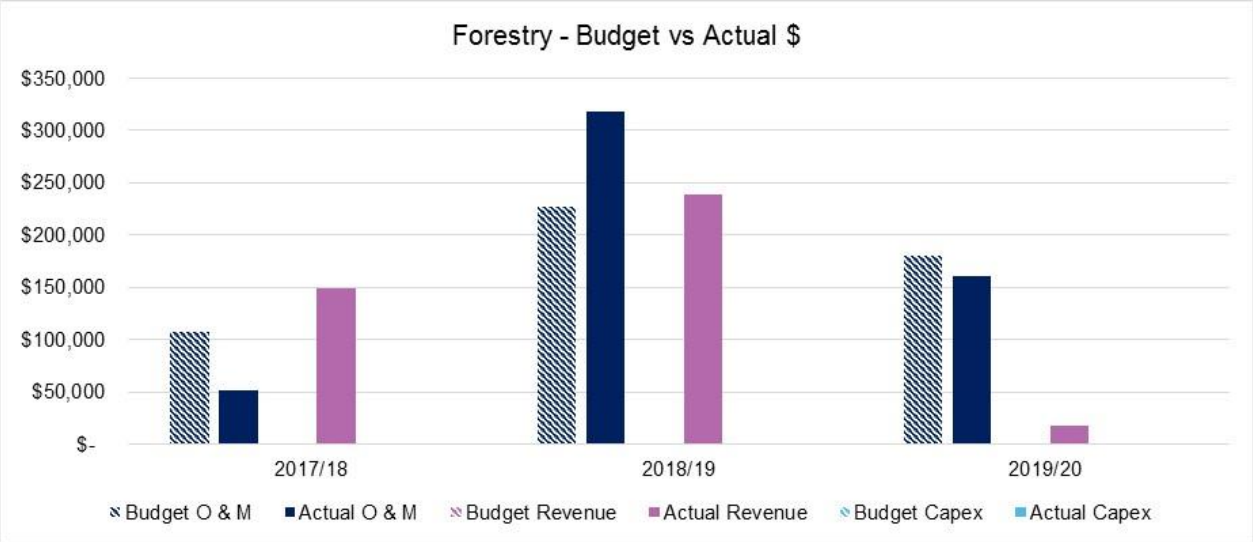


Figure 16-8: Forestry Historical Financial Performance

16.7.2 Operations and Capital

Note that there is no capital expenditure forecast for forestry operations over the planning period.

Forestry	Forecast 2021/22	Forecast 2022/23	Forecast 2023/24	Forecast 2024/25	Forecast 2025/26	Forecast 2026/27	Forecast 2027/28	Forecast 2028/29	Forecast 2029/30	Forecast 2030/31
Timber/Forest Sales	0	0	53,124	48,363	91,065	0	13,650	13,650	115,047	258,368
Operating Costs	154,053	83,729	94,746	95,847	88,383	84,155	76,619	70,161	69,899	99,083
Surplus/Deficit	-154,053	-83,729	-41,622	-47,484	2,682	-84,155	-62,969	-56,511	45,148	159,285

Table 16-17: Forestry Financial Summary

The following graph sets out the financial programme over the next 10 years.

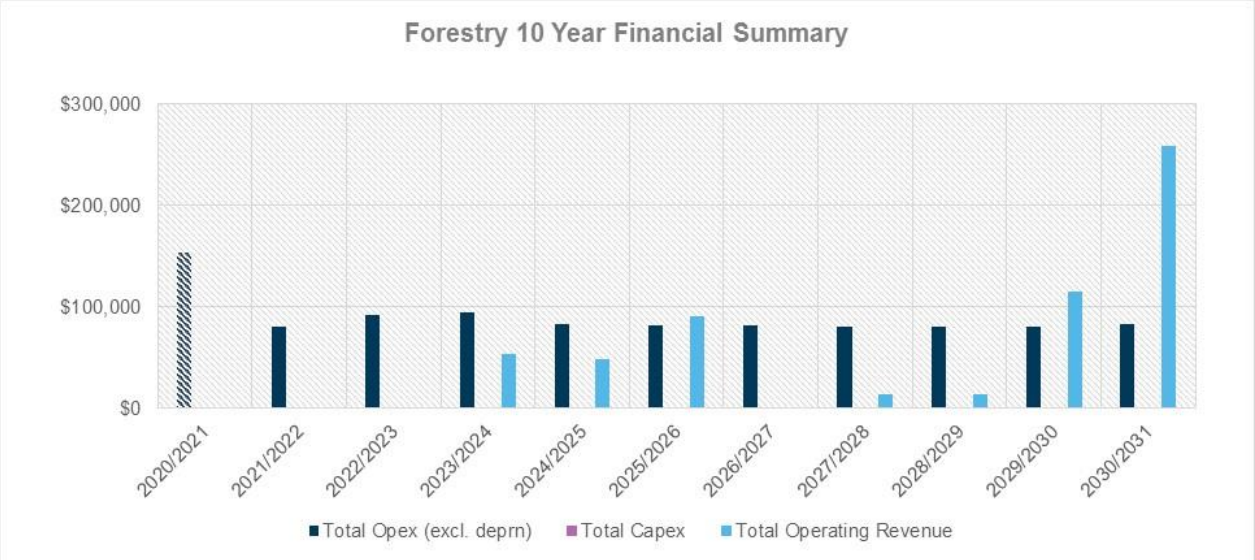


Figure 16-9: Forestry 10 Year Financial Summary

Forestry - Key Expenditure Programmes

The table below sets out the key financial programmes for the forestry activity over the next 10 years.

Location	Project Description	Timing	$	Comment
Various sites	Land Remediation	2022-2024	25k total	To continue land remediation after forced harvest
All sites	Weed and Pest Management	From 2021	185k total	To maintain sites to an acceptable standard

Table 16-18: Forestry Key Expenditure Programmes

The graph below sets out a net cash flow summary for Council's forestry operations. This indicates that the account will be in deficit for the majority of years over the next 10 year period as a result of low income streams and expenditure requirements to rehabilitate land and maintain forests. The low income from log sales is attributable to the age distribution of the tree crop with few areas identified for harvest during this period.

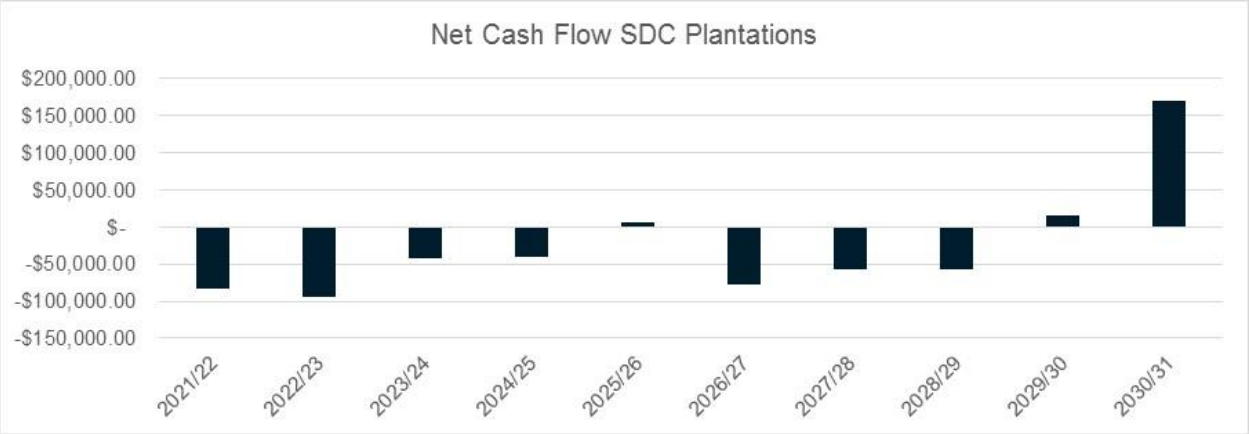


Figure 16-10: Forestry 10 Year Cash Flow Forecast

16.7.3 Funding

The general approach to funding forestry operations is set out below:

Operating Expenses (excluding depreciation) – Funded from a combination of sales revenue and general rates.

Capital Expenses – No capital expenditure is forecast

The activity has a commercial component in the production and sale of logs that generates revenue for Council. There are wider district benefits in terms of rural amenity and looking after marginal land holdings in a sustainable manner.

The nature of forestry operations and the fragmented age range of the forestry resource mean that revenue streams will not be consistent and operating expenses will need to be offset by a transfer from reserves (general rates) over the forecast period.

Annex 16A

Selwyn District Council Forestry Plantations

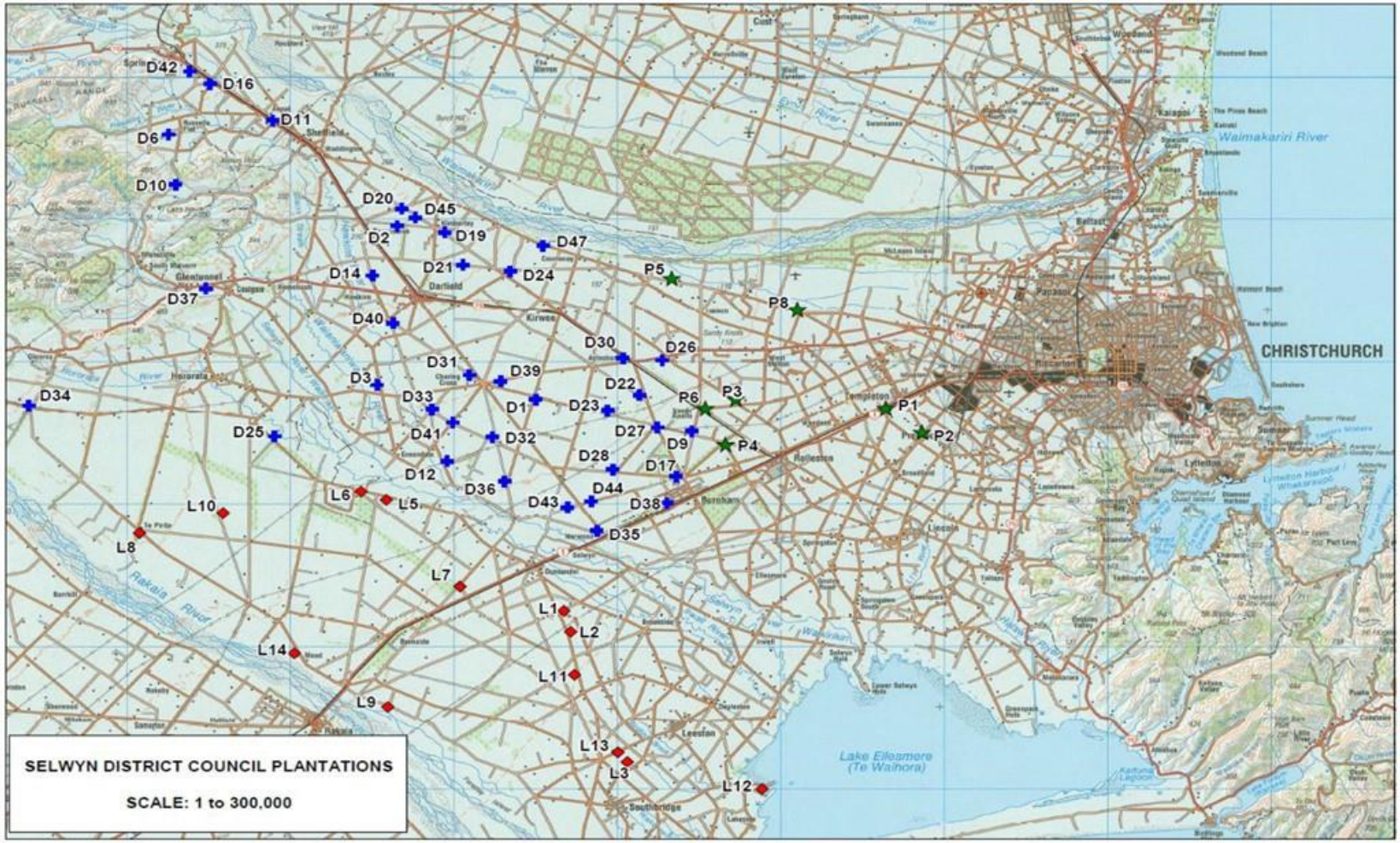
Selwyn District Council Forestry Plantations – Currently Planted

LOCATION	No.	Std.	NAME	SPECIES	EST. YEAR	Net Area (ha)	Total Area (ha)	SPH	DBH	TREE HEIGHT	PRUNE HEIGHT	SITE INDEX (M)	CROP TYPE	Legal Description	SI Method	Age
Darfield	D1	1	Wards & Courtenay Roads	P.rad	2018	2.0	2.0	1250					R20T	RES 1502	Heights	2
Darfield	D2	1	Auchenflower and Loes Rd	P.rad	2018	2.0	2.0	1250					R17M	RES 1538	Heights	2
Darfield	D3	1	Greendale Cemetery	Dfir	1940	0.7	1.2	100	55.0	38.0	0.0		DFIR	RES 1591		80
Darfield	D6a	1	Swamp Road	P.rad	1997	0.3	1.0	1250	0.0	0.2	0.0	23.5	R24T	RES 1432	Location	23
Darfield	D6b	2	Swamp Road	P.rad	1997	0.6	1.0						R17M	RES 1432	Location	23
Darfield	D9a	1	Sandy Knolls & Wards Rd	P.rad	1998	1.3	1.6						R20T	RES 1465		22
Darfield	D9b	1	Sandy Knolls & Wards Rd	P.rad	2004	0.3	0.4						R20T	RES 1465		16
Darfield	D11	1	Tramway Road, Annat	P.rad	1996	0.8	1.9	1500	0.0	1.2	0.0	23.5	R24T	RES 968	Location	24
Darfield	D12	1	Shipleys & Hollands Rd	P.rad	1998	1.5	2.0	1500	0.0	1.2	0.0	23.5	R24T	RES 1503	Location	22
Darfield	D14	1	Clintons Rd	P.rad	2018	2.0	2.0	1250	0.0	0.6	0.0	22.5	R20T	RES 1527	Location	2
Darfield	D16a	1	Coxs Rd & SH73	P.rad	1997	1.4	3.4	1250	0.0	0.5	0.0	23.5	R24T	RES 970	Location	23
Darfield	D16b	3	Coxs Rd & SH73	P.rad	2012	0.7	0.7	1250	0.0	0.0	0.0	23.5	R24T	RES 970	Location	7
Darfield	D17	1	Granges & Two Chain Rd	P.rad	2004	1.5	2.0	110	24.0	20.3	0.0	14.2	R20T	RES 1041	Heights	16
Darfield	D19	1	Tramway & Auchenflower Rd	P.rad	2003	0.9	1.9	900	24.7	22.5	2.2	18.5	R20T	RES 1533	Heights	17
Darfield	D22	1	Miles & Aylesbury Rd	P.rad	2011	2.0	2.0	600	22.9	16.5	2.6	19.6	R20T	RES 1461	Heights	9
Darfield	D23	1	Wards Rd	P.rad	2011	1.6	2.0	1000	21.7	16.8	2.4	20.0	R17M	RES 1494	Heights	9
Darfield	D24	1	Creyke & Homebush Rd	Dfir	1981	0.4	1.9	750	18.4	9.0	0.0		DFIR	RES 1531		39
Darfield	D25	1	Haldon Rd	P.rad	2008	1.6	1.9	700	23.2	16.5	2.7	19.6	R20T	RES 2318	Heights	12
Darfield	D26	1	Hoskyns Road & SH73	P.rad	2018	2.0	2.0	1250					R18T	RES 1463	Heights	2
Darfield	D27	1	Aylesbury & Wards Rd	P.rad	2011	1.6	2.1	1250					R20T	RES 1493	Heights	9
Darfield	D31	1	Wards Rd - Charing Cross	P.rad	2018	1.9	2.0	1250					R20T	RES 2215	Heights	2
Darfield	D32	1	Clintons & Stranges Roads	P.rad	2018	2.0	2.0	1250					R20T	RES 1506	Heights	2
Darfield	D33	1	Adams & Clintons Roads	P.rad	2018	2.0	2.0	1250					R17M	RES 2216	Heights	2
Darfield	D36	1	Courtenay & Stranges Roads	P.rad	2018	1.9	2.0	1250					R20T	RES 1500	Heights	2
Darfield	D37	1	Coalgate Cemetery	P.rad	2018	4.4	4.6	1250					R24T	RS 41685	Heights	2
Darfield	D39	1	Bealey Road	P.rad	2018	2.0	2.0	1250					R24T	RES 2213	Heights	2
Darfield	D40	1	McLauglins & Wards Rd	P.rad	1988	1.3	2.0	550	17.9	10.3	2.4	22.6	R24T	RES 1514	Heights	32
Darfield	D41	1	Ridgens & Clintons Roads	P.rad	2018	2.0	2.0	1250					R20T	RES 1505	Heights	2
Darfield	D45a	1	Tramway Rd	Dfir	2019	3.0	3.5	1250					DFIR	Road reserve & race	Heights	1
Darfield	D45b	2	Tramway Rd	P.rad	1988	0.0	0.0	800	19.6	10.8	2.5	23.5	R24T	Road reserve & race	Heights	32
Darfield	D45c	3	Tramway Rd	P.rad	1989	0.0	0.0	800	17.8	9.7	2.5	24.0	R24T	Road reserve & race	Heights	31
Darfield	D45d	4	Tramway Rd	P.rad	1998	0.9	1.3	1250					R24T	Road reserve & race		22
Darfield	D48	1	Addington Road	P.rad	2018	2.0	2.0	1250					R20T	RES 1530	Heights	2
Darfield	D49	1	Hoskyns & Sharps Roads	P.rad	2019	1.8	2.0	1250					R18T	RES 1462	Heights	1
Darfield	D50	1	Homebush Road	P.rad	2019	2.0	2.0	1250					R17M	RES 341	Heights	1
Leeston	L1	1	Leeston Dunsandel & Selwyn Rd	P.rad/Euc	1996	1.0	2.0	1500	0.0	1.0	0.0	20.0	R20T	RES 962	Location	24
Leeston	L2	1	Southbridge Dunsandel Road	P.rad	2018	2.0	2.0	1250					R20T	RES 1344	Location	2
Leeston	L3a	1	Cemetery Pit, Leeston	P.rad	2003	4.7	5.4	1250					R20T	RES 351	Heights	17
Leeston	L3b	2	Cemetery, Leeston	P.rad	2002	1.0	1.5	1250					R20T	RES 1434	Heights	18
Leeston	L5	1	Hororata Dunsandel Rd	P.rad	2018	4.0	4.0	1250					R20T	RES 1311	Location	2
Leeston	L6	1	Hororata Dunsandel & Wrights Rds	P.rad	2018	3.9	4.0	1250					R20T	RES 2297	Location	2
Leeston	L7a	1	Dunsandel Cemetery	P.rad	2002	2.6	3.0	1250					R20T	RES 2287	Location	18
Leeston	L7b	2	Dunsandel Cemetery - Pasture	P.rad	2002	2.4	3.0	1250					R20T	RES 2287	Location	18
Leeston	L8	1	Rakaia Terrace & Te Pirita Rd	P.rad	2008	9.7	10.0	1250					R18T	RES 2651	Heights	12
Leeston	L10	1	Morgans Rd	P.rad	1988	0.5	0.5	950	16.4	9.0	2.8	20.3	R17M	Saunders Rd	Heights	32
Leeston	L11	1	Southbridge Dunsandel Road	P.rad	2018	2.0	2.0	1250					R20T	RES 961	Location	2
Leeston	L13	1	Ellesmere Golf Course	P.rad	1984	1.2	2.0	1250					R20T	RES 964	Heights	36
Paparua	P1a	1	SH1 & Waterholes Rd	P.rad	2003	5.9	6.0	925	28.6	21.3	2.5	15.0	R20T	RS 40322	Heights	17
Paparua	P2	1	Trents & Shands Rd	P.rad	2004	1.3	2.4	775	28.5	19.1	2.8	18.1	R20T	RES 219	Heights	16
Paparua	P3	1	Pearce & Hoskyns Roads	P.rad	2018	2.0	2.0	1250					R24T	RES 1037	Location	2
Paparua	P5	1	Old West Coast & Hendersons Rd	P.rad	2004	1.7	2.0	825	27.2	21.8	2.8	16.6	R20T	RES 1458	Heights	16
Paparua	P6	1	Newtons & Railways Rd	P.rad	2011	1.4	2.1	600	29.2	21.2	2.8	21.2	R20T	RES 1464	Heights	9
Paparua	P8a	1	Old West Coast, Langdales & Adams Rd	P.rad	1996	2.1	2.8	1250	0.0	0.4	0.0	18.5	R18T	RES 342	Location	24
Paparua	P8b	1	Old West Coast, Langdales & Adams Rd	P.rad	1996	0.7	1.1	1250	0.0	0.4	0.0	18.5	R17M	RES 342	Location	24
					TOTAL AREA:	**102.5**	**122.2**									

Annex 16B

Forestry Sites Location Map

Forestry Sites Location Map



Annex 16C

Forestry 10 Year Financial Forecast

Forestry 10 Year Financial Forecast

Forestry 10 Year Financial Forecast												
	Budget 2020/21	Forecast 2021/22	Forecast 2022/23	Forecast 2023/24	Forecast 2024/25	Forecast 2025/26	Forecast 2026/27	Forecast 2027/28	Forecast 2028/29	Forecast 2029/30	Forecast 2030/31	10 Yr Total
Operating Revenue												
Timber/ Forest Sales	-	-	-	53,124	48,363	91,065	-	13,650	13,650	115,047	258,368	593,267
Total Operating Revenue	**-**	**-**	**-**	**53,124**	**48,363**	**91,065**	**-**	**13,650**	**13,650**	**115,047**	**258,368**	**593,267**
Opex												
Staff Costs												
Other Operating Expenditure												
Routine Maintenance & Operations	44,409	46,174	44,814	43,879	49,474	47,134	39,584	35,174	35,174	64,239	50,444	456,090
Total Other Operating Expenditure	44,409	46,174	44,814	43,879	49,474	47,134	39,584	35,174	35,174	64,239	50,444	456,090
Support Costs	35,740	37,555	37,432	36,942	35,459	34,997	34,781	34,987	34,725	34,844	35,024	356,746
Operating Projects												
Scheduled Maintenance Projects	73,904	-	12,500	15,026	3,450	2,024	2,254	-	-	-	2,760	38,014
Total Operating Projects	73,904	-	12,500	15,026	3,450	2,024	2,254	-	-	-	2,760	38,014
Total Opex	154,053	83,729	94,746	95,847	88,383	84,155	76,619	70,161	69,899	99,083	88,228	850,850
Operating Surplus/Deficit (excl. deprn)	**-154,053**	**- 83,729**	**- 94,746**	**- 42,723**	**- 40,020**	**6,910**	**- 76,619**	**- 56,511**	**- 56,249**	**15,964**	**170,140**	**- 257,583**
Depreciation												
Depreciation	-	-	256	256	256	696	696	696	1,144	1,144	1,144	6,288
Operating Surplus/Deficit (incl. deprn)	**-154,053**	**- 83,729**	**- 94,490**	**- 42,467**	**- 39,764**	**7,606**	**- 75,923**	**- 55,815**	**- 55,105**	**17,108**	**171,284**	**- 251,295**
Capex												
Capital Renewals	-	-	-	-	-	-	-	-	-	-	-	0
New Capital - Improved LOS	-	-	-	-	-	-	-	-	-	-	-	0
New Capital - Growth	-	-	-	-	-	-	-	-	-	-	-	0
Total Capex	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**