**Biomass Harvesting – A Sustainable & Economic Alternative**

### Introduction
A key debate in our current time is how to create a more resilient natural environment that supports our society in the context of climate change. Management of the land owned by Highways England beyond the edge of carriageway can contribute to this goal.

A-one+, as Managing Agent Contractor for Area 12 for Highways England, are exploring opportunities to use the 1778 hectares (ha) of soft estate in Area 12 as a biomass resource converting low grade timber into woodchip to provide sustainable, low carbon fuel for heat production through its maintenance activities. These woodland assets have been historically undermanaged and their economic potential untapped.

The Biomass Harvesting approach currently being adopted in Area 12 has considerable environmental benefits, together with demonstrating an innovative approach, sustainable procurement, effective implementation and management and demonstrates best value and the cost benefit of the approach – all of which are discussed in further detail below.

### Innovative Approach
A-one+ is leading the way in developing a financially and environmentally sustainable model for the management of the Highways England soft estate, in which innovative harvesting, extraction and haulage methods in the highway environment are being implemented. Prior to this trial no biomass had been extracted from Highways England woodlands to produce renewable energy and this source will create an as yet untapped income stream and offers the environmental benefits of effective woodland management practice. The trial also provides data that can be used to value the wooded soft estate as an asset, previously deemed an intangible figure and provides a meaningful biomass dataset that can be extrapolated on a national scale.

### Environmental Benefits
There are considerable environmental benefits to the Biomass Harvesting approach, where A-one+ is demonstrating that managing the land on behalf of Highways England can also deliver renewable energy potential, in which the woodland resource generates wood fuel as a substitute for high carbon footprint materials. Managing the woodland soft estate also enhances ground flora potential, diversifies species composition, and releases veteran trees and produces a more open and attractive woodland. It also contributes to enhancing carbon storage, opening up watercourses improving ecological condition and bank stability. The Biomass combustion process also produces less ash than coal and reduces ash disposal costs and landfill space requirements.

### Effective & Robust Planning Research & Procurement
No landscape contractor had previously approached Highways England with a view to extracting this material from site, due to the low volumes produced in isolated areas and a perceived difficulty in extracting biomass from the motorway environment. As a result, arisings from woodland activities have traditionally been felled and left in situ.

As part of the trial, Forestry Commission felling licences were granted for each of the selected sites and ecological walkovers were undertaken at each location to identify site constraints and appropriate methods of working and on-site supervision requirements (i.e. Ecological Clerk of Works).
A study was then undertaken to review the scope of possible works and estimate potential biomass harvest. Over 150 plots larger than 1ha were identified in Area 12, predicted to generate 4349 tonnes of biomass on the basis of a 35% thin (with an assumption of 170m² generating 1t of biomass). On completion of the study, four of the woodland plots were selected following detailed analysis of individual plot characteristics – size, age of tree stock, thinning potential and access.

**Sustainable procurement**

Early contractor involvement with supply chain partners proved invaluable providing recommendations on the plant requirements, production and productivity rates, yield for each plot and identifying end users. This information was then used to enable A-one+ to have a meaningful discussion with Highways England, satisfy their procurement process and ultimately fund the project.

**Implementation**

Tree felling commenced in January 2015 on the selected plots and felled timber was extracted to the verge where it was separated into firewood and timber for chipping.

Biomass is a growing market for all wood products, driven by government subsidies. A-one+ has demonstrated that biomass harvesting is a sustainable model that can be implemented nationally. The local small/medium scale biomass heat market (firewood, woodchip and pellets) is one which will grow in significance and provide an important market for the timber coming out of England’s undermanaged woodland resource. The economics of thinning and harvesting are becoming much more attractive for owners and viable for contractors. This trial has also contributed to the Humberhead Levels Nature Improvement Area project which is an example of working in partnership with adjacent landowners and leads to larger biomass yields.

**Best value and overall cost benefit**

Ultimately there needs to be an incentive for the timber to be extracted as biomass. During the trial period 1424 tonnes of biomass has been generated with a value of approximately £42,000. The success of the trial was echoed by the Area 12 Horticultural Manager who noted that “…the biomass trial was successfully completed to time and budget through innovative construction techniques and collaborative working, highlighted by A-one+’s biomass harvesting’ submission being shortlisted for ‘Project of the Year’ at the Constructing Excellence Yorkshire and Humber Awards 2015 taking place on 17th July 2015.”

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*The above article represents the personal opinion of the author and not necessarily those of CH2M*