



SITE IDENTIFICATION FOR THE ESTABLISHMENT OF 30MW SMALL SCALE BIOMASS POWER PLANTS IN SRI LANKA

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Sri Lanka Sustainable Energy Authority

**Site Identification for Establishment of
30MW Small Scale Biomass Power Plants**

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Acknowledgements

This report on the Site Identification of 30 MW of Small Scale Biomass Power Plants in Sri Lanka is prepared as a fulfillment of a requirement of the task assigned to me by UNDP Sri Lanka on behalf of the Ministry of Power for the Sri Lanka Sustainable Energy Authority.

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Executive summary

To identify potential sites to operate small scale biomass power plants DS divisions where the total biomass availability is greater than or equal to 2MW electricity generation equivalent were considered for the detailed assessment. Biomass potential data was taken from the biomass atlas published by the Sri Lanka Sustainable Energy Authority and it is given the total biomass potential in the respective geographical area. Even though such an amount is indicated in this atlas, the collection factor would be less than 100%. This is mainly due to the inaccessibility of some of the resources due to unavailability of proper road network in some of the areas, biomass generation in individual home gardens may not be adequate for selling as a commercial commodity, and some of the biomass used in agriculture sector as supportive structures.

With this scenario, the total biomass generation in the respective DS division would not be available at the power plant gate. As a conservative figure, a 30% collection factor has been considered with the DS divisions where the potential of biomass is equal to 2MW electricity generation equivalent or higher for detailed assessment

Following this methodology, suitable sites for total 35MW small scale power plants were selected island wide and all the sites have been selected closer to the 33kVA primary distribution line so that the grid interconnection cost can be minimized.

Power plants with two capacities were selected with 1MW and 0.5MW at the grid interconnection point, considering operation and maintenance aspects. It is advisable to cluster the power plants considering the geographical distribution and select a technology provider for this cluster so that power plant maintenance crew can be used cost effectively. Since the similar capacity technology is available in many places, a pool of spare parts can be maintained at the local office of the technology provider rather than having those individually.

Also, considering the capacity and the operation and maintenance aspects of these power plants, it is suggested to develop at least a few power plants in different locations with total minimum capacity of 2MW by a single developer so that the internal maintenance team can be pooled for these power plants and the operation and maintenance cost can be optimized.

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CHAPTER 01: SELECTION OF THE SUITABLE SITE FOR ESTABLISHMENT OF SMALL SCALE BIOMASS POWER PLANT

1. Introduction

Sri Lankan Government has taken many decisions to establish mini scale (below 10MW) biomass (Dendro) power plants during last 36 years but developments are progressing very slowly. The first report of this initiative on "Fuel wood plantation study" has been published on September 1994 by the Energy Conservation Fund. With a decision given by the Cabinet of Ministers on 18th August 2004, an Inter-Ministerial Working Committee (IMWC) was appointed by the Hon. Minister of Power & Energy with a view to prepare an action plan to develop biomass powered electricity generation industry to a much larger scale. Under this five year action plan, considering policy, economic, technical and social benefits, and establishment of 100 MW was proposed in three phases by 2010. Also, the committee was proposed special tariff with 8.50 LKR/kWh for first seven years and 7.00 LKR/kWh for remaining 8 years (this was for 15 year contract).

After establishing the Sri Lanka Sustainable Energy Authority in 2007, a separate tariff has been announced for dendro power plant and the last tariff was published in January 2012 and it was an escalable tariff with the economic conditions of the country and was proposed 23.44 LKR/kWh for the first year and 29.36 LKR/kWh for the 20th year.

Table 01: Feed in tariff published in 1st January 2012

Tariff - Rs./kWh	
1-8 years	
Non-escalable	9.67
Escalable base O&M rate- 5.16%	1.52
Escalable base fuel rate - 3.44%	12.25
9 - 15 years	
Non-escalable	3.72
16 - 20 years	
Non-escalable	2.11

However, the dendro power plants have not been established as expected in the ground level. The total capacity available in the country now is 38.7MW and out of these only 60% of the capacity is successfully operating.

It has been noticed that the biomass has not become a commercial product as expected in rural communities and due to this the biomass supply chains has not grown. Growing of biomass has not become profitable business compared to the other agriculture crops. So, getting biomass in large quantities is a challenge now.

However, there are limited quantities generated in the agricultural and home gardens during cleaning and land preparation activities as a by products and those quantities are available for commercial use. Also, it is an additional income to the societies.

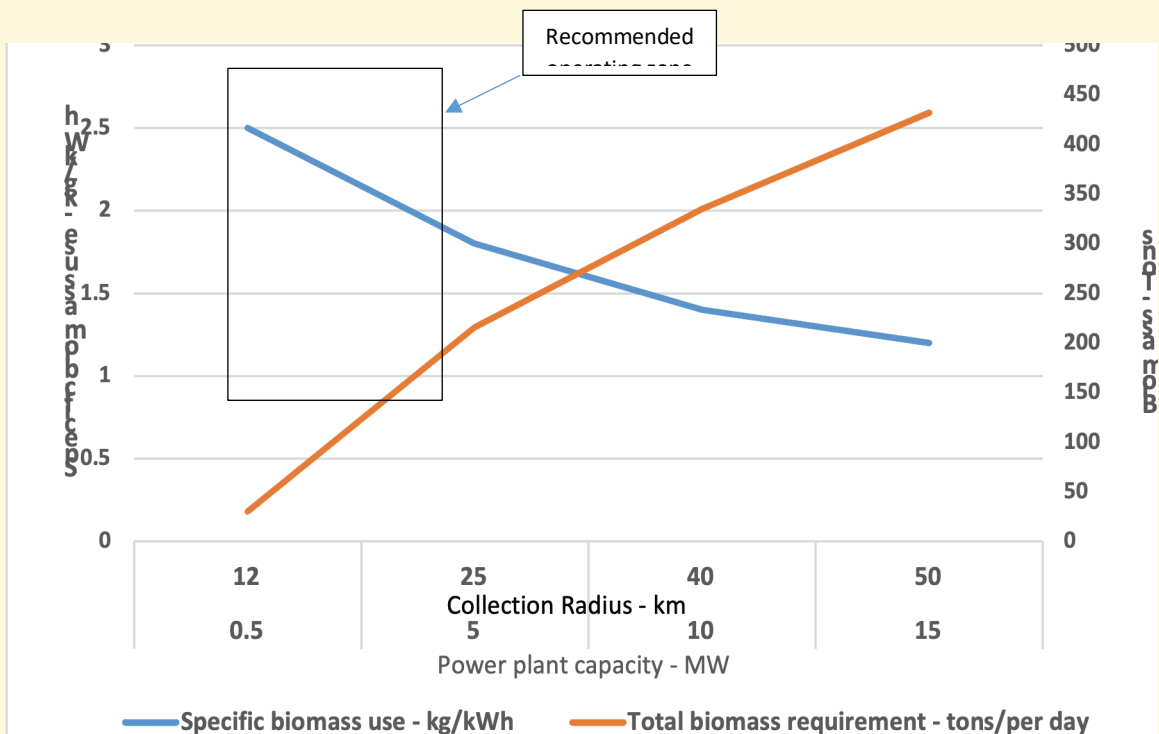
Information 1.1: Biomass processing cost

In average, a person can cut maximum 3m³ of biomass per day (Approximately 1000kg wet biomass). The daily wages for a person is around 1500.00 LKR per day. The purchasing price of the wet biomass at the farm gate is around 2.00 to 2.50 LKR per kg, so that the net income selling biomass is approximately 0.50 to 1.00 LKR per kg. In this scenario, considering all the other expenses, growing of biomass would not be a profitable business.

To convert it in to a profitable business, either it is needed to increase the purchasing cost or enhance the personnel productivity. Productivity can be enhance through mechanization the harvesting. To get the real advantage of mechanization, biomass growing techniques and agronomy practices need to improve and new machines need to introduce. This topic has been discussed many times but not been implemented successfully yet.

Information 1.2: Cost of biomass vs. cost of power generation

The specific biomass use for power generation varying from 1.2kg/kWh to 2.5kg/kWh. The power plants with the capacity of 10MW or above consume about 1.2kg of biomass/kWh and it will increase up to 2.5 kg/kWh when the power plant capacity reduces up to 500kW. Biomass with 25% to 30% moisture is considered for this analysis. However, the total biomass requirement increases with the increase of the power plant capacity so that the biomass collection radius need to expand. The following graph indicates the specific biomass requirement, total biomass use and the biomass collection radius for the different capacities of biomass power plant.



Considering all the factors, it has been identified smaller capacities between 0.5MW to 3MW is more suitable for establishment of biomass power plants in Sri Lanka. The details of the technologies of small scale biomass power plants have been discussed under a study on "Feasibility of Small Scale Biomass Power Plants in Sri Lanka" carried out by UNDP during 2019/20.

Information 1.3: Biomass use Vs. Thermal energy generation

On average one liter of diesel or furnace oil can be replaced with 3.5 to 4.0kg of biomass. The cost of biomass at the factory gates is varying from 6 Rs./kg to 8.50 Rs./kg depending on the quality and type. Chipped wood sells at 8.50 Rs./kg and logs sell at 6 Rs./kg. The thermal energy utilization efficiency is in the range of 65% to 72% with the available technologies but biomass to electricity conversion efficiency is only around 22%. The simple payback period of the fuel switching exercises are very attractive since fossil fuel prices are increasing day by day and it is in the range of 1 to 1.5 years. But these biomass prices are not economically viable for electricity generation industry since electricity generation industry is highly competitive with the present electricity generation mix.

With this scenario, biomass power generation can be considered

1. The areas where biomass are available within 15km to 20km radius as a byproduct of home garden and agriculture activities
2. The high poverty areas in Sri Lanka where supply of biomass gives an additional support to the rural economy and
3. The areas where limited or no thermal energy applications are available.

1.1. Site selection criteria

Site selection has done in few steps. The details of the selection process is described in this section and for easy understanding the total process is given in the following picture.

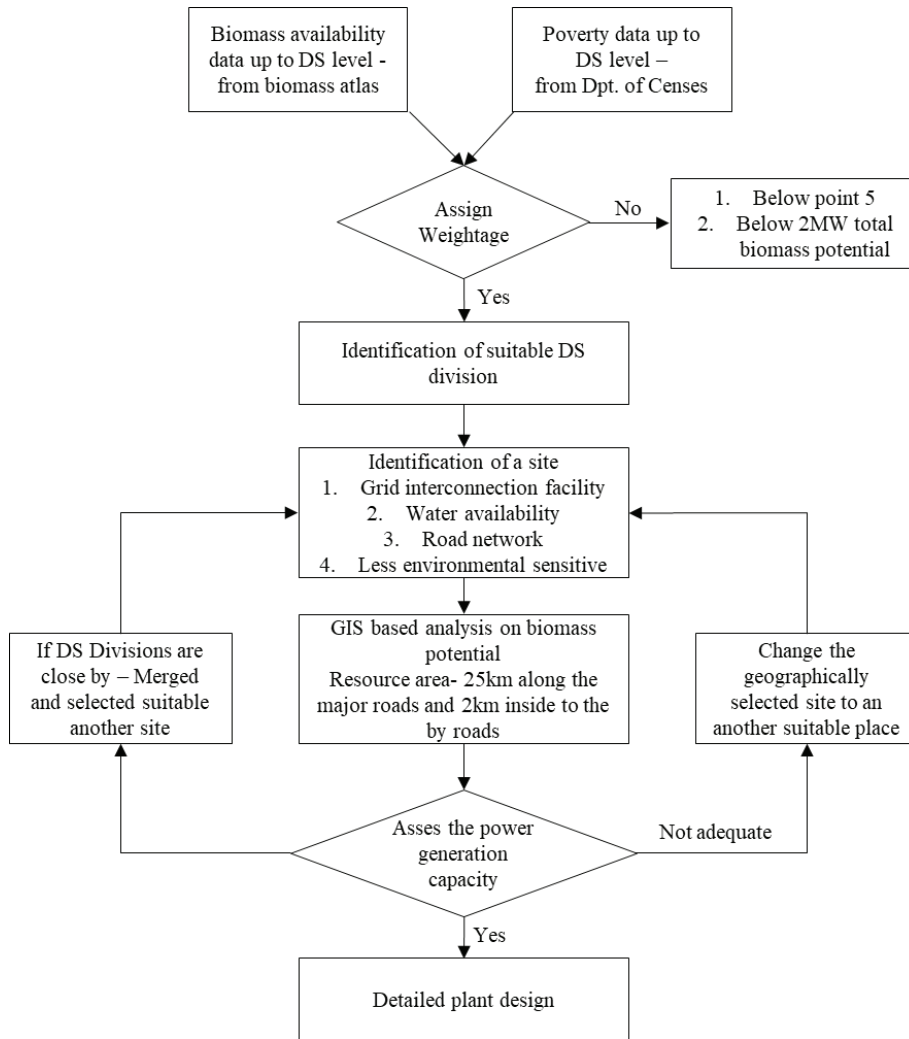


Figure 01: Schematic diagram of the site selection process

1.1.1. Selection of a suitable Divisional Secretary area

Initial screening: The DS divisions where the total biomass availability is greater than or equal to 2MW electricity generation equivalent were considered for the detailed assessment. Biomass potential data was taken from the biomass atlas published by Sri Lanka Sustainable Energy Authority and it is given the total biomass potential in the respective geographical area. Even though such amount is indicated in this atlas, the collection factor would be less than 100%. This is mainly due to

- Inaccessibility of some of the resources due to unavailability of proper road network in some of the areas
- Biomass generation in individual home gardens may not be adequate for selling as a commercial commodity.
- Some of the biomass is used in agriculture sector as supportive structures.

With this scenario, the total biomass generation in the respective DS division would not be available at the power plant gate. As a conservative figure, it has been considered 30% collection factor and considered the DS divisions where the potential of biomass is equal to 2MW electricity generation equivalent or higher for detailed assessment.

Detailed assessment: After initial screening, detailed assessment were done for selection of suitable sites for establishment of 30MW biomass power plants considering main three factors as described below. Biomass availability, the head count index and the numbers of poor people in DS divisions' level were considered and weightage for each elements has been assigned as given in the table 1.2. The poverty level (head count index and the no. of poor people) has been obtained from the Department of Censes and the details of biomass potential available is taken from the biomass atlas developed by Sri Lanka Sustainable Energy Authority. Priority has been given both to the high poverty and high biomass density areas. Both biomass potential and the poverty information are available up to Divisional Secretary (DS) levels and the DS divisions who obtained above 5 marks of the total weightage were considered at this stage for further analysis.

Table 02: Power plant selection criteria

Weightage	1	2	3	4	5
Biomass potential - MW	0-3	3-6	6-9	9-12	Above 12
Head Count Index -%	0-10	10-20	20-30	30-40	40-50
No. of poor people	1-3000	3000-6000	6000-9000	9000-12000	Above 12000

Based on this analysis, suitable DS divisions have been selected and the details are available in the annex i. and the sample is given in the following table.

Table 03: Site selection matrix

District	Divisional Secretary	Biomass Potential - MW	Poverty		Weightage			Total Marks
			Head count index - %	No. of poor people	Biomass potential	Head count	No. of poor people	
Batticaloa	Eraur Pattu	13.97	24.69	18242	5	3	5	13
Batticaloa	Manmunai West	8.28	45.14	12776	3	5	5	13
Monaragala	Siyambalanduwa	17.63	28.7	15041	5	3	5	13
Monaragala	Bibile	13.41	20.67	8085	5	3	3	11
Monaragala	Madulla	20.02	25.95	7830	5	3	3	11
Monaragala	Medagama	17.30	23.66	8245	5	3	3	11
Monaragala	Wellawaya	17.52	18.07	10584	5	2	4	11
Batticaloa	Koralai Pattu North (Vaharai)	20.60	27.99	5950	5	3	2	10
Batticaloa	Koralai Pattu South (Kiran)	5.86	37.68	9811	2	4	4	10
Mannar	Manthai West	17.50	26.9	3893	5	3	2	10
Mullativu	Maritimepattu	9.02	28.61	8096	4	3	3	10
Ratnapura	Embilipitiya	8.63	10.02	13290	3	2	5	10
Monaragala	Thanamalvila	15.80	21.33	5561	5	3	2	10
Ampara	Maha Oya	14.58	15.94	3146	5	2	2	9
Nuwara Eliya	Ambagamuwa	8.05	6.80	13890	3	1	5	9
Polonnaruwa	Welikanda	13.30	10.59	3432	5	2	2	9
Kurunegala	Pannala	14.56	6.78	8257	5	1	3	9
Kilinochchi	Karachchi	2.95	20.36	12291	1	3	5	9
Mannar	Mannar Town	7.44	19.88	9801	3	2	4	9
Mullativu	Oddusudan	6.74	33.49	4972	3	4	2	9
Mullativu	Puthukudiyirippu	3.81	35.66	8466	2	4	3	9
Mullativu	Thunukkai	7.07	34.03	3244	3	4	2	9
Ratnapura	Balangoda	9.13	10.33	7481	4	2	3	9
Badulla	Haldummulla	17.00	11.61	4276	5	2	2	9
Badulla	Rideemaliyadda	11.74	14.73	7361	4	2	3	9
Monaragala	Badalkumbura	11.80	19.13	7497	4	2	3	9

1.1.2. Evaluation of Biomass availability

The suitable DS Division for establishment of biomass power plant has been identified based on the analysis describe in the section 1.1.1. After identifying the suitable DS division, specific location for establishment of the power plant has been identified based on the details available in “google maps” and “google earth” tools. Following criteria has been taken in to account for selection of specific location and for assessing the availability of biomass for this specific location.

Resource area - 15 km one-way distance from the power plant and 1.5 km from the main road to inside were considered and demarcated the biomass resource area for the proposed power plant. This details has been established based on the results of the transport study carried out by “Sustainable Biomass Project” of UNDP, FAO and SLSEA and the sensitivity analysis done with the cost variation of biomass. Home gardens and mixed crop lands have been considered for this biomass resource assessment as described in information 1.2. With the increase of the resource area, the cost of transport increases so that the project would not be viable. The cost of transport has been limited to Rs. 0.85/kg of firewood for this analysis.

The average yield of the home garden (mixed crop) - 5000 kg/ha per year. This is a very conservative figure compared to the other analysis conducted in Sri Lanka. The renewable energy master plan for Sri Lanka developed by the Asian Development Bank in 2014 indicates that the firewood coming from 500 hectares with mono crops and 1500 hectares with mixed crops is adequate to operate 1MW steam turbine based power plant with 80% plant factor. If it is converted in to biomass the annual generation would be 5750 kg/ha/year in mixed crop lands.

Biomass use for other thermal applications - As given in the information 1.3, use of biomass in thermal energy application is much profitable than use in electricity generation process. So, identified the thermal energy users with the secondary data available, and estimated the biomass requirement for such applications.

Percentage of possible collection - 30%; this figure has been estimated based on the specific survey carried out in Balangoda and Thanamalwila area with the secondary data. Assessed the biomass use in bakeries, tea factories, brick manufacturing process and use of wooden poles in agriculture practices as the supportive structures and considered this data for establishment of the collection factor.

As discussed in this section, assessed the biomass use in thermal energy applications in the particular areas and considered the net amount available for power generation. Total biomass available for power generation can't be fully utilize since the collection efficiency is varying due to multiple factors in place to place and as a conservative figure 30% collection efficiency was considered for this analysis.

Specific biomass use in power generation facilities - The specific biomass use for small scale biomass power plant would be in the range of 2.0 to 2.5 kg/kWh. As a conservative figure, if it is considered 2.5 kg/kWh, it is required 18,615 tons of biomass annually to operate 1MW biomass power plant. Considering the above scenario the possible total biomass collection for the selected location was assessed and if this quantity is not adequate even to operate 0.5MW capacity power plant, changed the originally selected location to a new one and the assessment repeated. The same methodology was followed for the second cycle also and the sites which have not shown the availability of adequate biomass even after the second cycle were rejected.

1.1.3. Grid interconnection facility

The cost of the grid interconnection is approximately 3,000,000.00 LKR/km. This includes material and construction cost. So, selecting a suitable location for power plant near to the grid interconnection point leads to reduce the power plant capital cost. Since the generation capacity of a power plant is small, the plant can be connect to the 33kVA primary distribution line directly.

1.1.4. Water availability

The makeup water requirement of 1MW steam turbine power plant would be around 4.025 m³/hr. this includes evaporation loss at the cooling tower, blow down loss at the cooling tower, blow down loss at the boiler and the de-aerator tank loss.

Information 1.4: Hourly makeup water requirement - 1MW steam turbine power plant		
Cooling tower evaporation loss	-	3.125 m ³
Cooling tower blow down loss	-	0.75 m ³
Boiler blow down loss	-	0.1 m ³
De-aerator tank loss	-	0.05 m ³
Total	-	4.025 m ³

Dedicated water source is required for supplying this quantity. If the power plant can establish closer to a stream or a reservoir is the ideal solution, or otherwise need high yield surface or tube well. Tube wells produce 25 liters/min to 1000 liters/min depending on the depth and the location and need to conduct a water survey before selecting a location for a power plant.

1.1.5. Environmental impact

As per the volume of work involvement in this proposed projects, it is not required to obtain both EIA and IEE. Any activity which does not come under the EIA or IEE procedure and possibility of discharging effluents, wastes, emission of smoke/gases/fumes /vapor or excessive noise/vibration into the environment is required to obtain an environmental recommendation (ER).

Environmental Recommendation is a document issued by the Central Environmental Authority with conditions to control & manage the environmental issues before establishment of a project/activity which the investors have to abide by.

At the stage of power plant came in to operation, it is required to obtain the environmental protection license (EPL) for the operation. The EPL is a regulatory/legal tool under the provisions of the National Environmental Act No: 47 of 1980 amended by Acts No 56 of 1988 and No 53 of 2000.

Information 1.5: Requirement for Environment Protection License

The Gazette of the Democratic Socialist Republic of Sri Lanka
EXTRAORDINARY

අංක 1533/16 - 2008 ජනවාරි 25 වැනි සිකුරාදා - 2008.01.25
No. 1533/16 - FRIDAY, JANUARY 25, 2008

(Published by Authority)

PART I : SECTION (I) — GENERAL

Government Notifications

THE NATIONAL ENVIRONMENTAL ACT, No. 47 of 1980

Order under Section 23A

BY virtue of the powers vested in me by section 23A of the National Environmental Act, No. 47 of 1980 as amended by Act, Nos. 56 of 1988 and 53 of 2000. I, Patali Champika Ranawaka, Minister of Environment and Natural Resources, do by this Order, determine the activities set out in the Schedule hereto as activities for which a License is required under the aforesaid section being activities which involves or results in discharging, depositing or emitting waste into the environment causing pollution.

PATALI CHAMPIKA RANAWAKA,
Minister of Environment and Natural Resources.

Colombo,
14th January, 2008.

THE SCHEDULE

THE PRESCRIBED ACTIVITIES FOR WHICH A LICENSE IS REQUIRED

PART A

1. Chemicals manufacturing or formulating or repacking industries.
2. Soaps, detergents, softener or any other cleansing preparations manufacturing industries having a production capacity of 1,000 kilograms per day or more.
 71. Railway workshops or all bus depots having vehicle servicing activities.
 72. All vehicle emission testing centres.
 73. Electrical power generating utilities excluding standby generators and hydro or solar or wind power generation.
 74. Printing presses with lead smelting or newspaper printing or printing process which generates wastewater or colour photographs processing centres.
 75. Paper and Pulp Industries or corrugated cartons manufacturing industries.
 76. Any industry where 200 or more workers per shift are employed.

Mainly the waste water discharge, stack emission, boundary noise level and the vibration causing activities of the facility is evaluated during the assessment stage for EPL. All the details are given in the website of the Central Environmental Authority and the website link is <http://www.cea.lk/web/implementation-of-environmental-protection-license-scheme> . Also these details have been discussed in the “Feasibility of Small Scale Biomass Power Plants in Sri Lanka” carried out by UNDP during 2019/20.

Considered these EPL requirement when selecting a suitable site. For an example, the noise level is reducing as per the inverse square law with the distance from the noise source, and considered the distance and the natural noise barriers (Hill, forest etc.) from the nearest residence when selecting the site. If it is a flat and bare land, 150m distance from the residence

was considered and this figure was established based on the details available in an operating power plant in the similar range in Dehiaththakandiya area.

1.2. Specimen Site Selection

1.2.1. Selection of two suitable sites

Two sites have been selected in Thanamalvila and Balangoda DS divisions considering the geographical condition, biomass use for other thermal energy applications, water availability in addition to the analysis results given in section 1.1.1.

Based on the biomass availability, 1.2MW and 0.6MW power plants were selected for Balangoda and Thanamalwila sites respectively.

Thanamalvila site is in dry zone and Chena cultivation is the main income in this area. Tea estates and tea factories are available in Balangoda and part of the biomass generated in this area is use in these factories.

1.2.2. Details of the two sites

Table 04: Details of Balangoda and Thanamalvila site

Description	Balangoda site	Thanamalvila site
Site location coordinates	6°37'21.56"N, 80°46'21.84"E	6°27'38.2"N 81°00'53.1"E
GN division	Bowaththa	Maha Wewa
District	Ratnapura	Monaragala
Nearest grid substation	Balangoda	Embilipitiya

1.2.3. Details of the two lands selected

Balangoda site

This is an abundant home garden with 2 acre in land area. There is a school about 200m away to the eastern side of this land and other than this there is no any residence close by. The proposed land is adjoining to the abundant tea land belong to Balangoda plantation and now they are maintaining a fuel wood plantation in these lands.

The land is almost flat and there is a small paddy field eastern corner of this land cultivate through spring water throughout the year. The water table of this land is very shallow and the well water will be adequate to run this proposed 1.2MW power plant.



Figure 2: Balangoda Site

Road from Balangoda town to Watawala and Mulgama villages is running by the side of this proposed land. The traffic condition of this road is very minimum and there is hardly any disturbances for transporting fuel wood.

Thanamalvila site

Thanamalvila site is located by the side of Maha Wewa, 12 km toward Hambegamuwa from Bodagama Junction along Bodagama, Hambegamuwa, Kalthota road (B521). The site is almost flat and it is an abundant Chena land with 2.5 acre. The land area is more than adequate for establishment of the proposed power plant also easy to meet the EPL requirements.



Figure 3: Thanamalvila Site

A water requirement can be fulfilled from the Maha Wewa water tank available nearby or through a tube well. An extract from a hydrogeology study carried in Hambantota district is given below and it says 440 liters/min is available in Bodagama area in 70 to 100m depth. This amount is more than adequate to run 0.6MW steam turbine power plant.

Chapter 4 Hydrogeology

4.2.3 LOWER FRACTURED AQUIFER (FRACTURED AQUIFER, 70 TO 100 M. IN DEPTH)

Figure 4.3 shows the number of wells classified by yield. The 18 wells (7.2 %) yielded more than 100 litres/min. The bar chart shows that the range of the yield from 100 to 200 litres/min was prominent. No.M-2(2) (Bodagama) and No.M-4(2) (Yalabowa) were drilled to 100 m to confirm the productivity of this fractured zone. As a result, the pumping tests of No.M-2(2) and No.M-4(2) were conducted for 72 hours with the pumping rate of 440 and 610 litres/min respectively. No.M-3 (Badalkumbura) yielded more than 5000 litres/min during the drilling from 83 to 88 m depth.

1.2.4. Biomass availability for two sites

Balangoda site

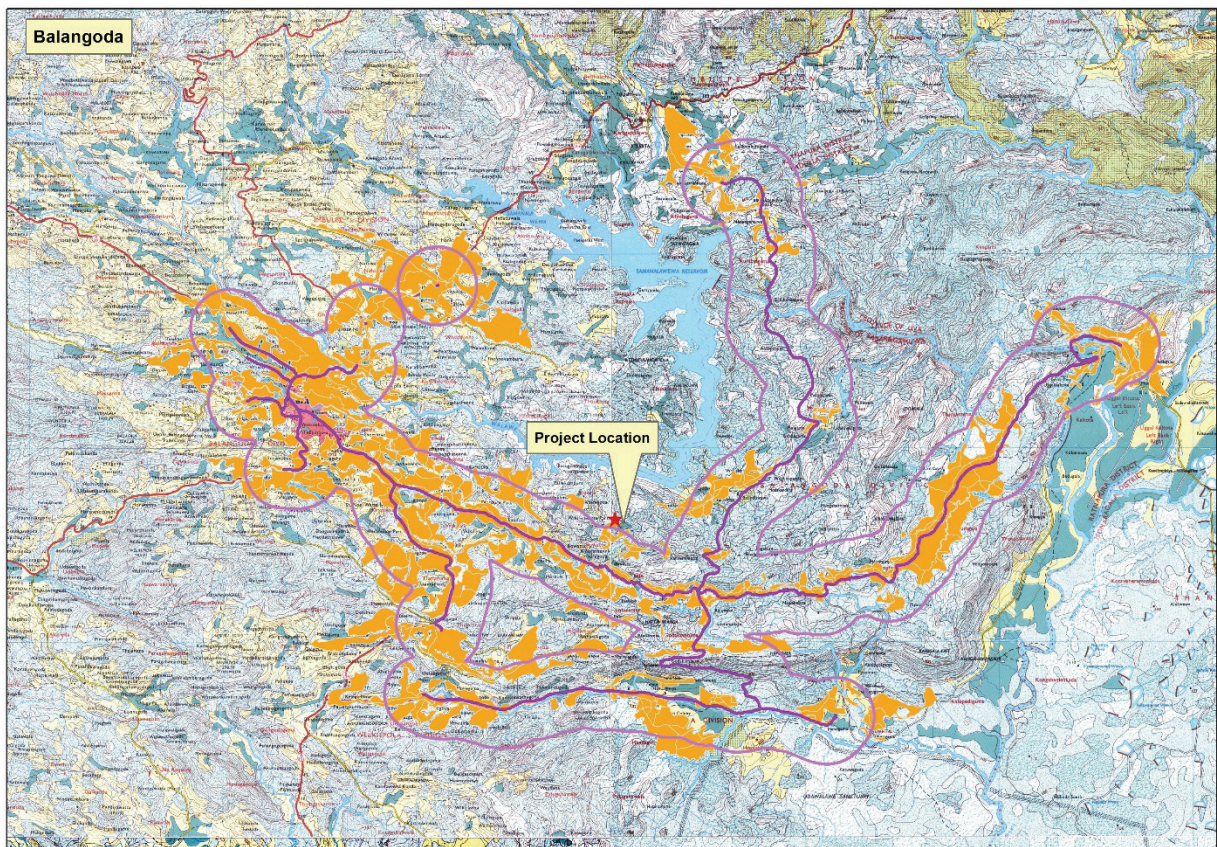


Figure 4: Biomass resource area of the Balangoda site

Resource area	-	16,000 ha
Biomass potential	-	80,000 tons/year
4 tea factories are available in Balangoda area		
Biomass requirement for tea factories	-	1 800 tons/year (5 m ³ per factory per day)
Collection efficiency	-	30%
Biomass availability at the plant gate	-	24,000 tons/year
Equivalent plant capacity	-	1.3 MW with 85% plant factor

Thanamalvila site

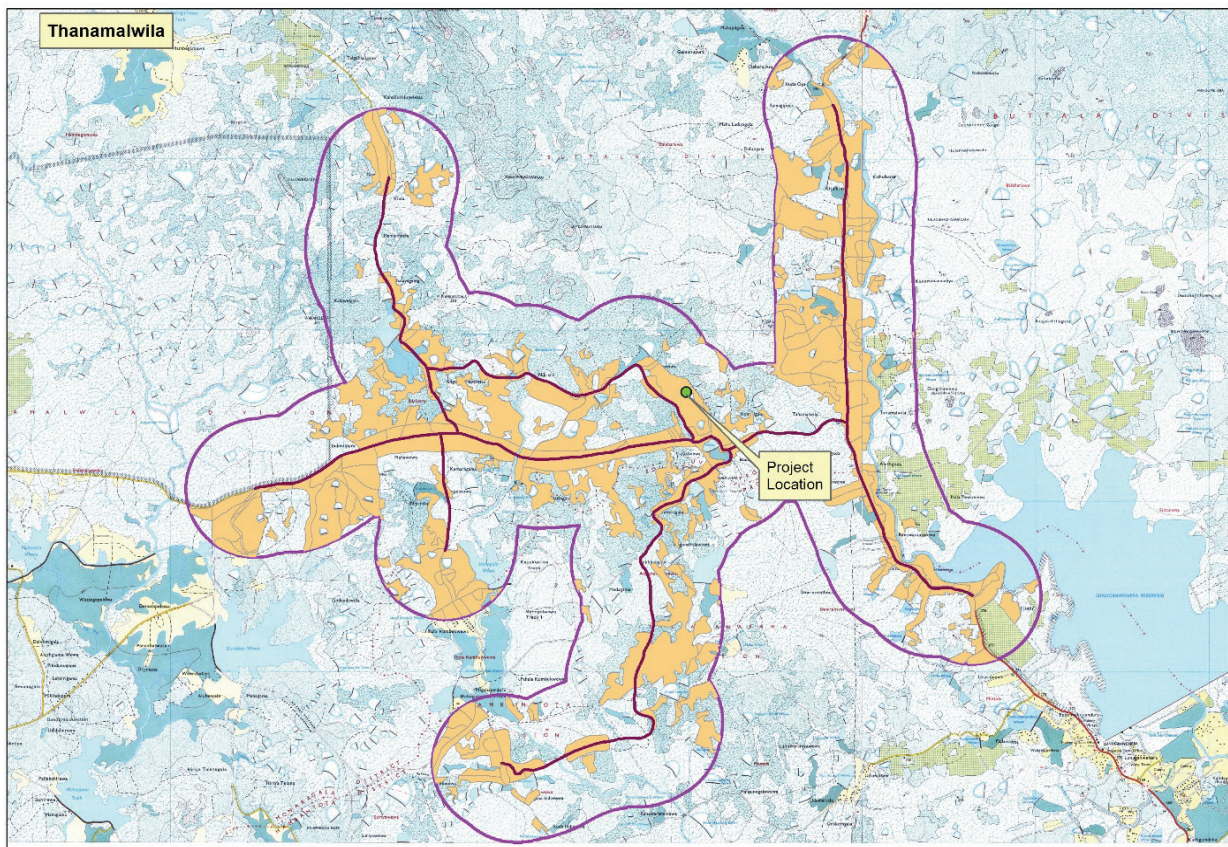


Figure 5: Biomass resource area of the Thanamalvila site

Resource area	-	7500 ha
Biomass potential	-	37500 tons/year
Collection efficiency	-	30%
Biomass availability at the plant gate	-	11 250 tons/year
Equivalent plant capacity	-	0.6 MW with 85% plant factor

1.2.5. Grid interconnection details

The 33 kVA primary distribution line is running through both the sites, so that the grid interconnection cost is minimum. The 33kVA line running through the Balangoda site is connected to the Balangoda grid substation and running up to tunnel intake of the Samanalawewa hydro power station.



Figure 6: 33kV primary distribution line running through the Thanamalvila site.



Figure 7: 33kV primary distribution line running through the Balangoda site.

CHAPTER 02: RESULTS OF THE SUITABLE SITES SELECTED FOR ESTABLISHMENT OF 30MW SMALL SCALE BIOMASS POWER PLANT IN SRI LANKA

2. Introduction

Chapter 01 presented the methodology followed for selection of the suitable site for establishment of the small scale biomass power plant. Following this methodology, suitable sites for total 35MW small scale power plants were selected island wide and the details are presenting in this chapter. As indicated in the chapter 01, all the sites have been selected closer to the 33kVA primary distribution line so that the grid interconnection cost can be minimized.

As described in the methodology, it has been selected 48 sites during the first round of analysis and referred ten sites for the second round changing the plant location, since the biomass availability of these sites were not adequate even to operate the smaller capacity of power plant. Two sites were qualified during the second round of analysis and eight sites were rejected. The details of those sites are summarized in to one page for easy reference and presented in this chapter.

Power plants with two capacities were selected with 1MW and 0.5MW at the grid interconnection point, considering operation and maintenance aspects. It is advisable to cluster the power plants considering the geographical distribution and select a technology provider for this cluster so that he/she can maintain the power plant maintenance crew (External maintenance team) effectively. Since the similar capacity similar technology is available in many places, a pool of spare parts can be maintained at the local office of the technology provider rather having those individually.

Also, considering the capacity and the operation & maintenance aspects of these power plants, it is suggested to develop at least few power plants in different locations with total minimum capacity of 2MW by single developer so that the internal maintenance team can be pooled for these power plants and the operation and maintenance cost can be optimized.

2.1. Summary of the one pages

Table 05: List of power plant locations

No.	Location	Capacity MW	Cumulative Capacity - MW
01	Koduwamadu, Chenkalady	0.5	-
02	Madugama, Siyambalanduwa	1.0	1.5
03	Aralupitiya, Bibile	1.0	2.5
04	Calgamuwa, Bibile	0.5	3.0
05	Kinnarabowa, Medagama	1.0	4.0
06	Maha Aragama, Wellawaya	1.0	5.0
07	Keekkirapuram, Mullaitivu	0.5	5.5
08	Halmillaketiya, Embilipitiya	1.0	6.5
09	Maha Wewa, Thanamalwila	0.5	7.0
10	Maha-Oya, Ampara	1.0	8.0
11	Badalgama, Makandura	1.0	9.0
12	Bowatta, Balangoda	1.0	10.0
13	Manthenna, Beragala	1.0	11.0
14	Redeemaliyadda North, Badulla	1.0	12.0
15	Unuvinna East, Hanguranketha	1.0	13.0
16	Thennehenwala, Walapane	1.0	14.0
17	Medawachchihandiya, Horowpothana	0.5	14.5
18	Kahatagadigiliya West, Kahatagasdigiliya	1.0	15.5
19	Walpola, Medawachchiya	1.0	16.5
20	Molakepoopathana, Tissamaharamaya	1.0	17.5
21	Halmillakulama, Nochchiyagama	1.0	18.5
22	Ukkulankulama, Rambewa	1.0	19.5
23	Sembukulama, Mihinthale	1.0	20.5
24	Urapotha, Bingiriya	1.0	21.5
25	Warakawehera, Dodangaslanda	1.0	22.5

No.	Location	Capacity MW	Cumulative Capacity - MW
26	Thalagaskanda, Pallebadda	1.0	23.5
27	Veraketagoda, Uhana	0.5	24.0
28	Periyapalam, Mutur	0.5	24.5
29	Kumbukwewa, Habarana	0.5	25.0
30	Dummalasooriya, Udubaddawa	1.0	26.0
31	Wavegedara, Wariyapola	1.0	27.0
32	Nochchimoddoi, Vauniya	0.5	27.5
33	Mayurapura, Hambanthota	1.0	28.5
34	Damana, Ampara	0.5	29.0
35	Silwathgama, Galewela	1.0	30.0
36	Helambawewa, Mahavilachchiya	1.0	31.0
37	Thalawa	1.0	32.0
38	Perakumpura, Medirigiriya	1.0	33.0
39	Kottukachchiya, Anamaduwa	1.0	34.0
40	Imbulpe, Balangoda	1.0	35.0

Table 05 (Contd.): List of power plant locations

Table 06: Details of rejected sites

No.	Location	Capacity - MW
01	Koralai Pattu North (Vaharai), Batticaloa	0.48
02	Manthai West, Mannar	0.51
03	Karachchi, Kilinochchi	0.36
04	Manthai East, Mullativu	0.41
05	Madhu, Mannar	0.43
06	Pothuvi, Ampara	0.23
07	Kandavalai, Kilinochchi	0.45
08	Welioya, Mullativu	0.30

2.2 Implementation Mechanism

As indicated in chapter 01, establishment of small scale biomass power plants is a new strategy for enhancing the biomass based power generation capacity in Sri Lanka. Selection of the technology and the selection of suitable sites have been done based on the available information in the field. Also, it has been considered the prevailing issues in the biomass sector for this analysis. However, since this is a new initiative, it is recommended to implement this total project in two or three phases. Select best sites based on the easiness of implementation and operation and consider for the first phase.

Numbers of detailed site visits have been done for selection of these 40 sites, and according to the consultant's understanding and the feelings, the following sites are more suitable for implementation under the first phase.

Table 07: Recommended sites for phase one implementation

No.	Location	Capacity - MW
01	Madugama, Siyambalanduwa	1.0
02	Maha Aragama, Wellawaya	1.0
03	Halmillaketiya, Embilipitiya	1.0
04	Maha Wewa, Thanamalwila	0.5
05	Mahaoya, Ampara	1.0
06	Bowatta, Balangoda	1.0
07	Rideemaliyadda, Badulla	1.0
08	Molakepoopathana, Thissamaharamaya	1.0
09	Sembukulama, Mihinthale	1.0
10	Warakawehera, Dodangaslanda	1.0
11	Mayurapura, Hambanthota	1.0

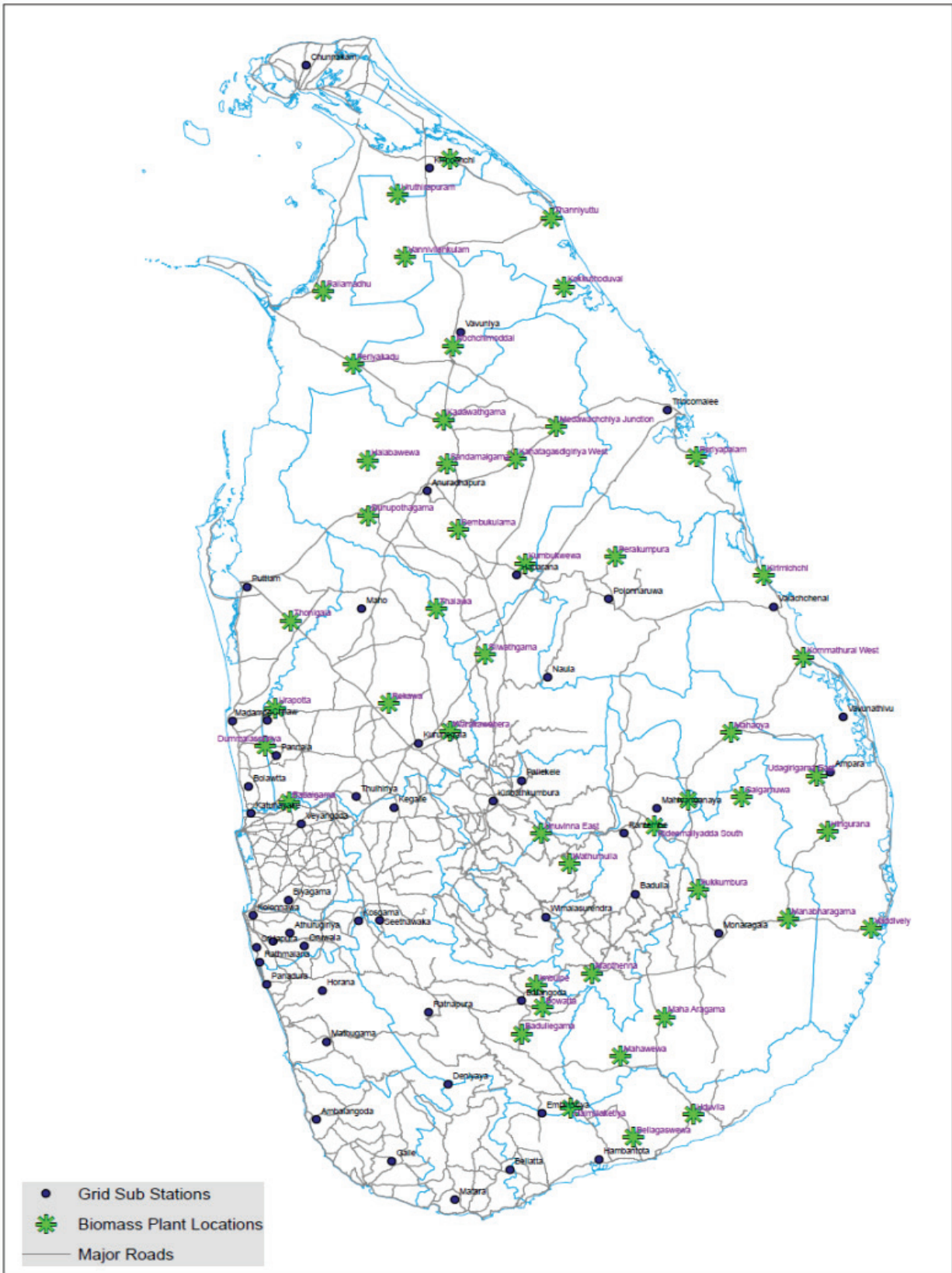


Figure 08: The power plant locations identified

No. 01

Cumulative
Capacity - 0.5MW

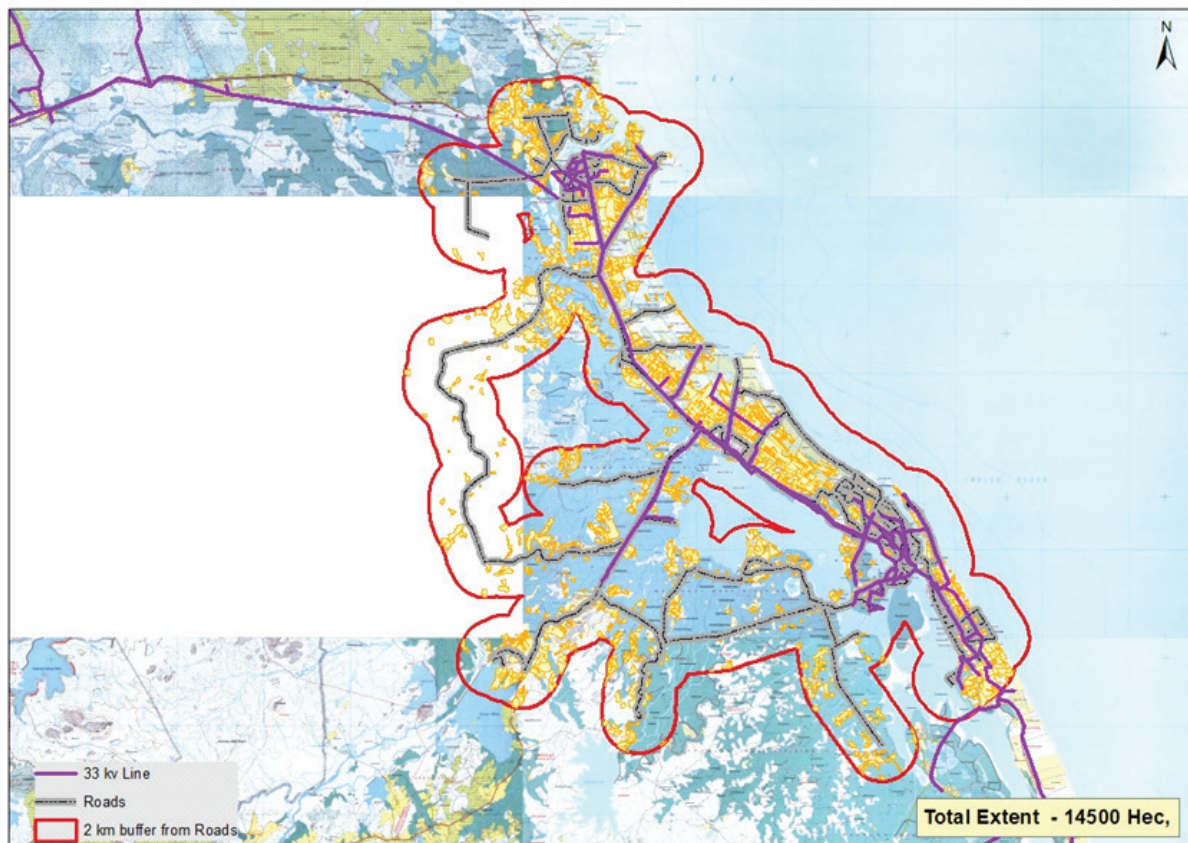
**Site details of 0.5 MW biomass power plant at
Koduwamadu, Chenkaladdy**

Name of the GN Division - Koduwamadu
Divisional secretariat - Eraur Paththu
District - Batticaloa
Nearest town - Chenkaladdy

Coordinates of the sites -
7°46'41.6"N 81°35'13.0"E
Land area: 2.5 Ha
Distance to nearest town: 1km

Site description: Site is located by the side of Badulla-Chenkaladdy highway, 1km away from Chenkaladdy town toward Maha Oya and closed to Kadiraweli Aru Bridge. This a completely flat land and 33kVA primary distribution line is running through the site and no any difficulty for grid interconnection.

Land ownership: Government land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 14500 Ha
Biomass availability: 7 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.5MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Valachchenai

Water availability: taken from nearby Kadiraweli Aru.

25

No. 02

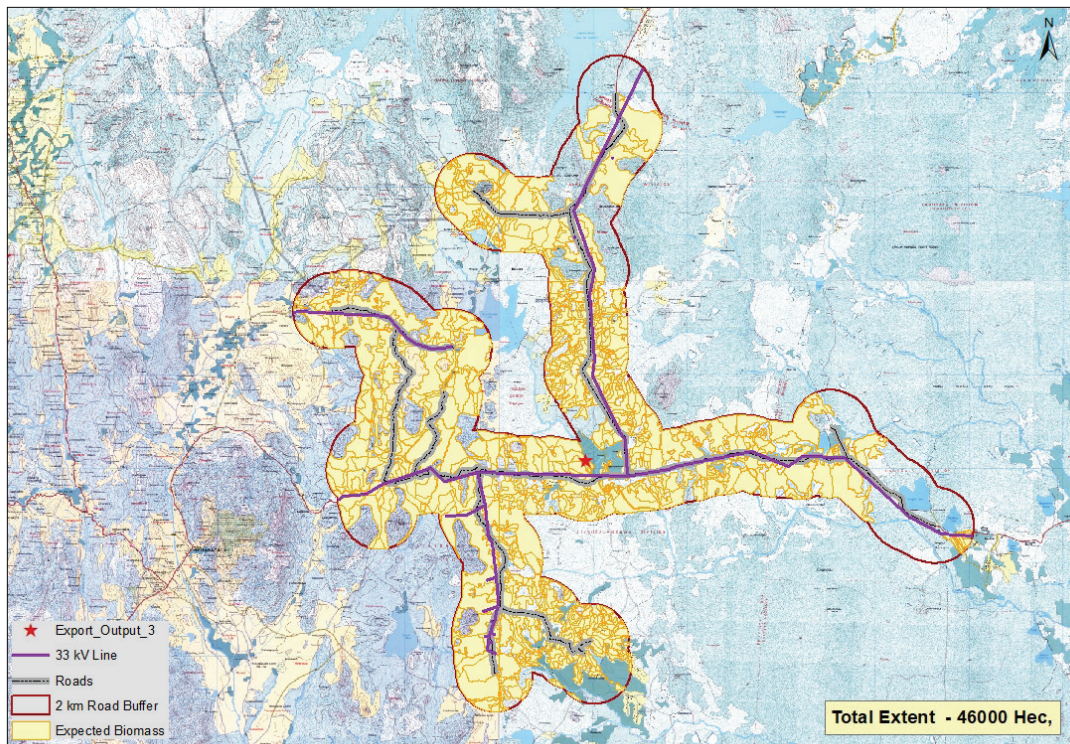
Cumulative
Capacity - 1.5MW

**Site details of 1.0 MW biomass power plant at
Madugama, Siyambalanduwa**

Name of the GN Division - Madugama
Divisional secretariat - Siyambalanduwa
District - Monaragala
Nearest town - Siyambalanduwa

Coordinates of the sites -
6°54'48.9"N 81°32'15.8"E
Land area: 3.5 Ha
Distance to nearest town: 3km

Site description: Site is located by the side of Colombo - Batticaloa highway (A4), 3km away from Siyambalanduwa town toward Monaragala and close to Hada Oya. Access to water is easily available from Hada Oya and the 33kVA primary distribution line is available 1km away from the proposed site.
Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 46000 Ha
Biomass availability: 245 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.5MW

**Distance between 33kVA primary
distribution line and the site:** 1km
Substation: Monaragala

Water availability: taken from nearby Hada Oya.

26

No. 03

Cumulative Capacity - 2.5MW

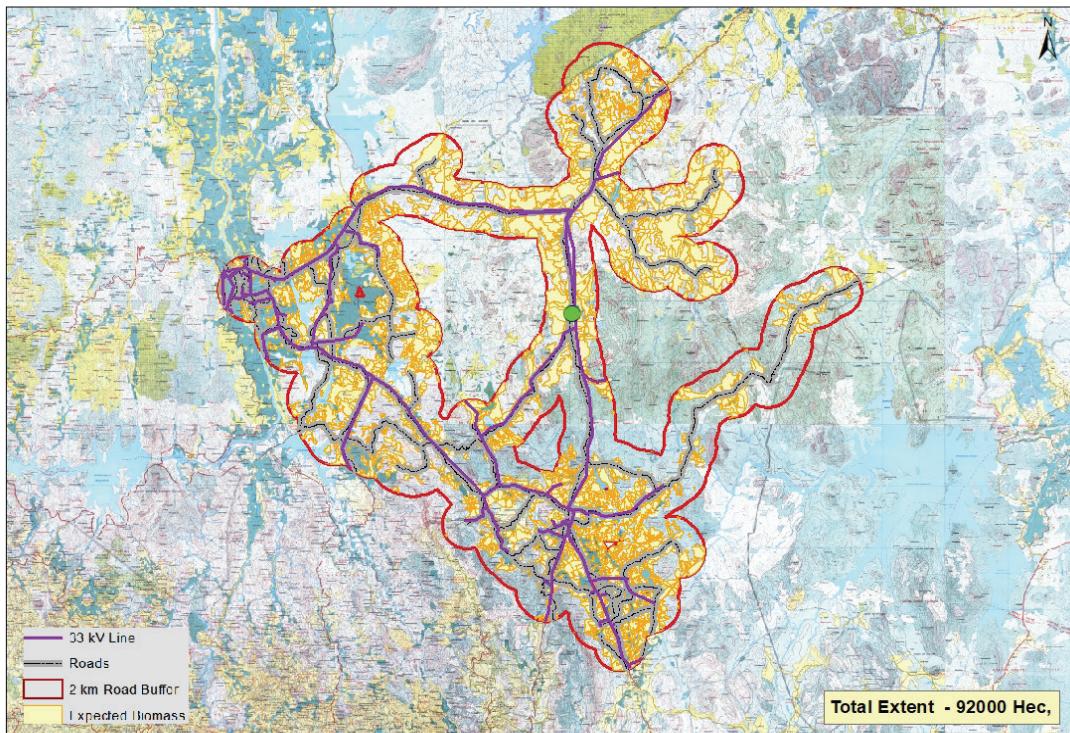
Site details of 1.0 MW biomass power plant at Aralupitiya, Bibile

Name of the GN Division - Aralupitiya
Divisional secretariat - Rideemaliyadda
District - Badulla
Nearest town - Bibile

Coordinates of the sites -
7°18'27.9"N 81°13'35.4"E
Land area: 2.0 Ha
Distance to nearest town: 16.5km

Site description: Site is located by the side of Badulla-Chenkaladdi highway (A5), 8.25km away from Padiyathalawa Junction toward Bibile and by the side of Maduru Oya. The land is almost flat and need earth filling before use. Access to water is easily available from Maduru Oya and the 33kVA primary distribution line is running through the site.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 92000 Ha
Biomass availability: 375 tons/day
Equivalent plant capacity for steam turbine based power plant: 7MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Mahiyangana

Water availability: taken from nearby Maduru Oya.

No. 04

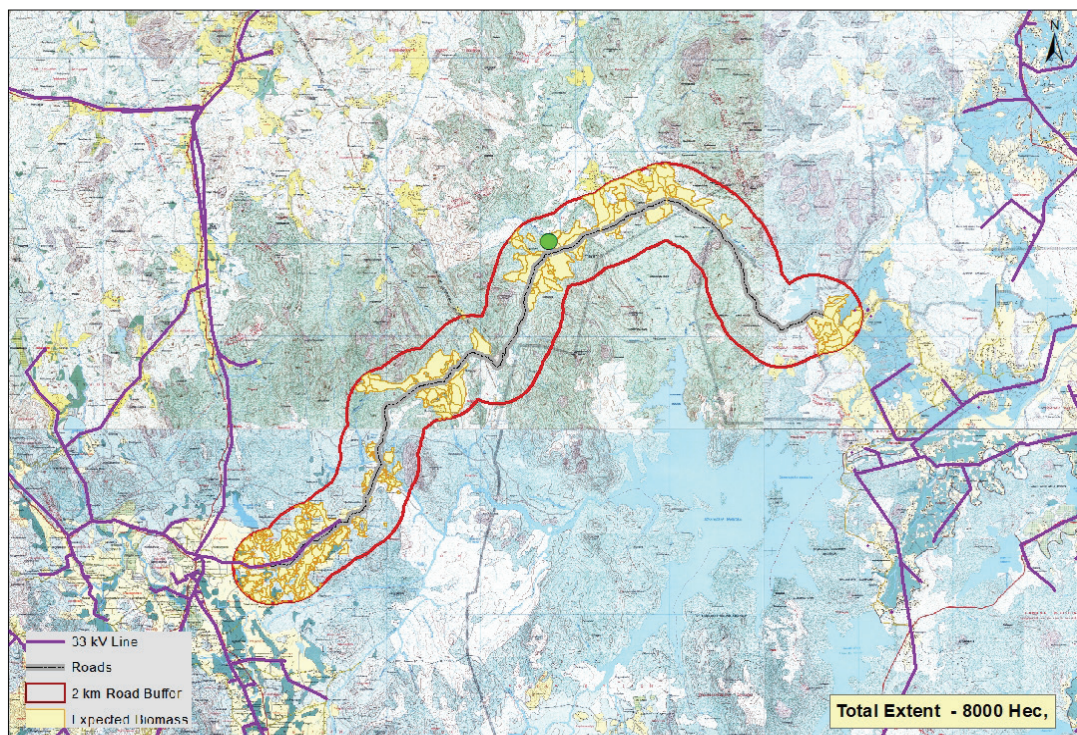
Cumulative Capacity - 3.0MW

Site details of 0.5 MW biomass power plant at Galgamuwa, Bibile

Name of the GN Division - Galgamuwa
Divisional secretariat - Madulla
District - Monaragala
Nearest town - Bibile

Coordinates of the sites -
7°19'03.4"N 81°23'35.4"E
Land area: 3.0 Ha
Distance to nearest town: 10km

Site description: Site is located 1.5km away from Bibile - Inginiyagala main road and by the side of Rambaken Oya. Access to water is available without any difficulty and the grid interconnection point is available 1.5km away from the site. Land is almost flat and need minor preparation.
Land Ownership: Government land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 8000 Ha
Biomass availability: 45 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.6MW

Distance between 33kVA primary distribution line and the site: 1.5km
Substation: Mahiyangana

Water availability: taken from nearby Rambaken Oya.

No. 05

Cumulative Capacity - 4.0MW

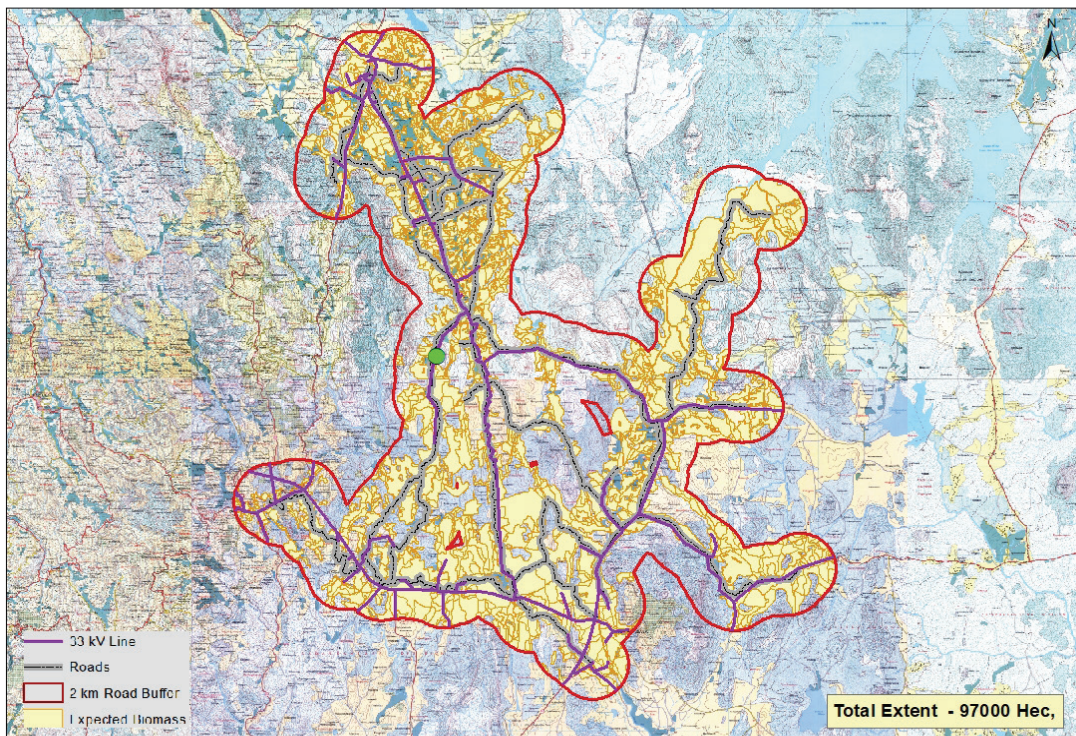
Site details of 1.0 MW biomass power plant at Kinnarabowa, Medagama

Name of the GN Division - Kinnarabowa
Divisional secretariat - Madagama
District - Monaragala
Nearest town - Medagama

Coordinates of the sites -
7°00'43.2"N 81°15'28.4"E
Land area: 3.0 Ha
Distance to nearest town: 4km

Site description: Site is located by the side of Bibile-Kandavinna road. There is no any water resources such as tank or river nearby and need to access to the ground water. The water table in this area is very shallow and no any difficulty obtaining ground water. The 33kVA primary distribution line is running through the site.

Land Ownership: Government land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 97000 Ha
Biomass availability: 520 tons/day
Equivalent plant capacity for steam turbine based power plant: 10MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Monaragala

Water availability: taken from tube wells

No. 06

Cumulative Capacity - 5.0MW

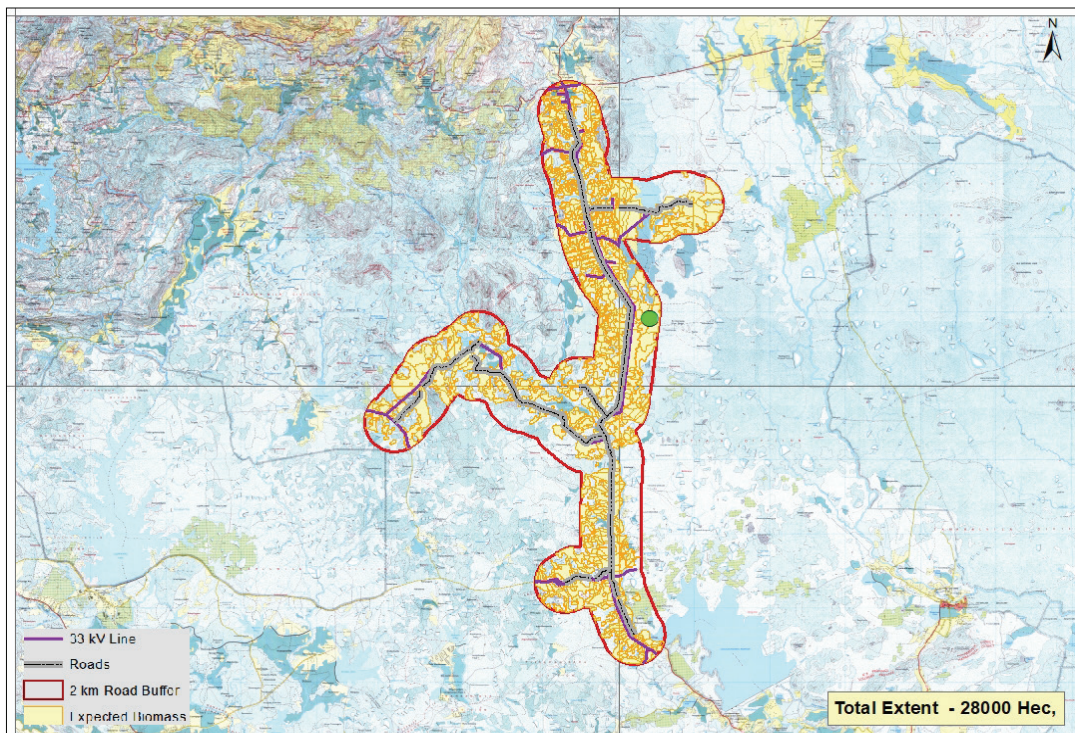
Site details of 1.0 MW biomass power plant at Maha Ara Gama, Wellawaya

Name of the GN Division - Maha Ara Gama
Divisional secretariat - Wellawaya
District - Monaragala
Nearest town - Wellawaya

Coordinates of the sites -
6°35'21.0"N 81°09'07.8"E
Land area: 3.0 Ha
Distance to nearest town: 16km

Site description: Site is located by the side of Colombo-Hambanthota-Wellawaya highway (A2). This site is very close to the Kirindi Oya and no any major issue in accessing water. The 33kVA primary distribution line is running through the main road and closed by.

Land Ownership: Government land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 28000 Ha
Biomass availability: 150 tons/day
Equivalent plant capacity for steam turbine based power plant: 3.0MW

Distance between 33kVA primary distribution line and the site: 1.8km
Substation: Monaragala

Water availability: taken from nearby Kirindi Oya.

No. 07

Cumulative
Capacity - 5.5MW

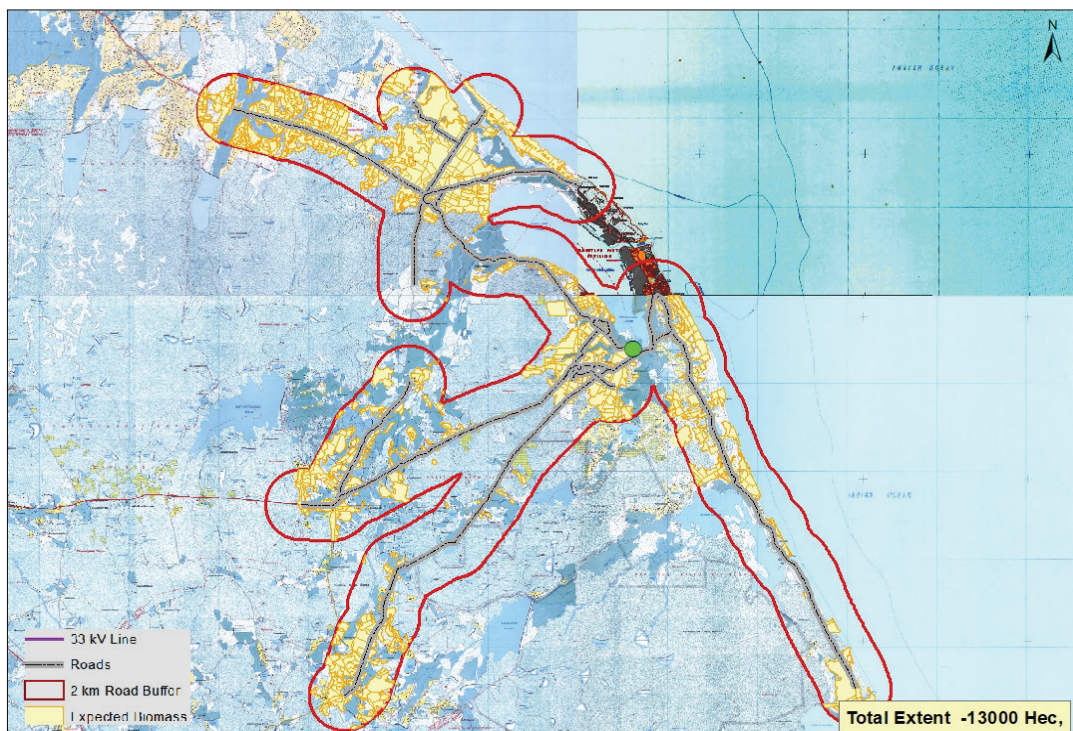
**Site details of 0.5 MW biomass power plant at
Keekkirapuram, Mullaitivu**

Name of the GN Division - Keekkirapuram
Divisional secretariat - Marithime Paththu
District - Mullaitivu
Nearest town - Mullaitivu

Coordinates of the sites -
9.233639, 80.799770
Land area: 5.0 Ha
Distance to nearest town: 5.75km

Site description: Site is located 600m away from Mankulam-Mullaitivu highway and by the side of the Wattapallai road. This land is facing to a paddy field and the ground water level in this area is very shallow. Ground water is adequate to run a power plant in this area and any emergency situation the water available in the adjoining lagoon can be use after treating.

Land ownership: Government land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 13000 Ha
Biomass availability: 70 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.3MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Vavuniya

Water availability: Ground water or treating the water available in adjoining lagoon

31

No. 08

Cumulative Capacity - 6.5MW

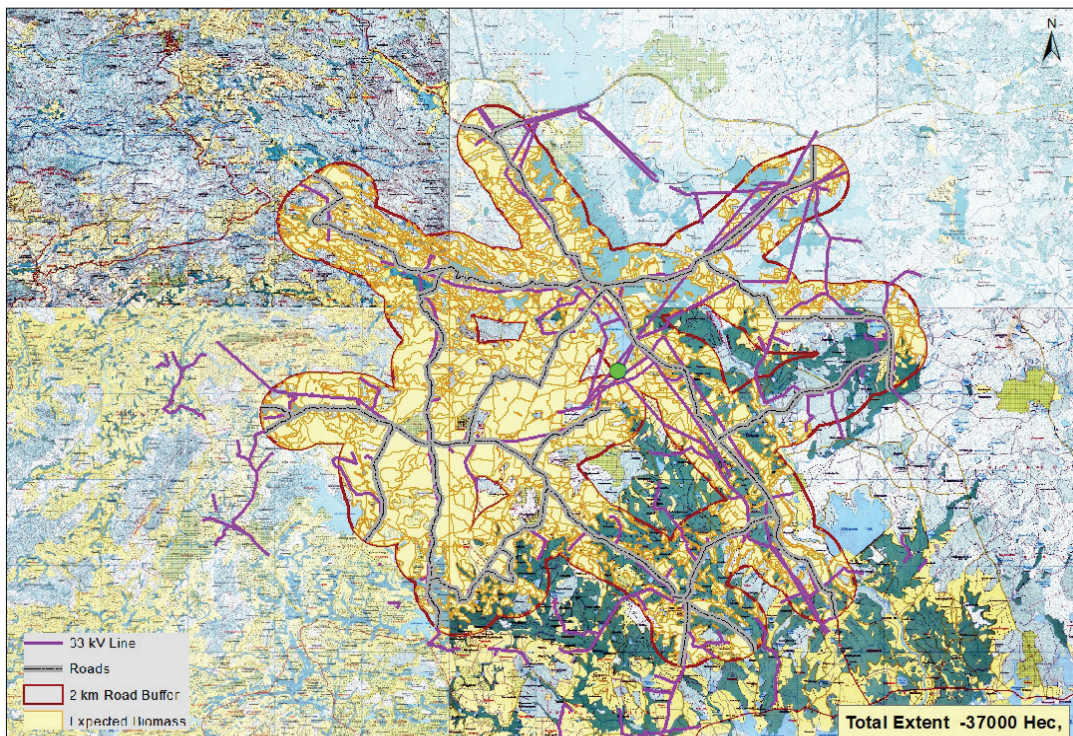
Site details of 1.0 MW biomass power plant at Halmillaketiya, Embilipitiya

Name of the GN Division - Halmillaketiya
Divisional secretariat - Embilipitiya
District - Ratnapura
Nearest town - Embilipitiya

Coordinates of the sites -
6°17'19.8"N 80°51'34.2"E
Land area: 2.4 Ha
Distance to nearest town: 7.2km

Site description: Site is located 2.4 away from Embilipitiya-Nonagama highway and close to Chandrika Wewa and Embilipitiya grid substation. This land belongs to National Paper Company Limited and now it is not utilizing fully and this abandon land is idea for a development project like this.

Land ownership: Government land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 37000 Ha
Biomass availability: 200 tons/day
Equivalent plant capacity for steam turbine based power plant: 3.75MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Embilipitiya

Water availability: taken from nearby channel running from Chandrika Wewa.

32

No. 09

Cumulative Capacity - 7.0MW

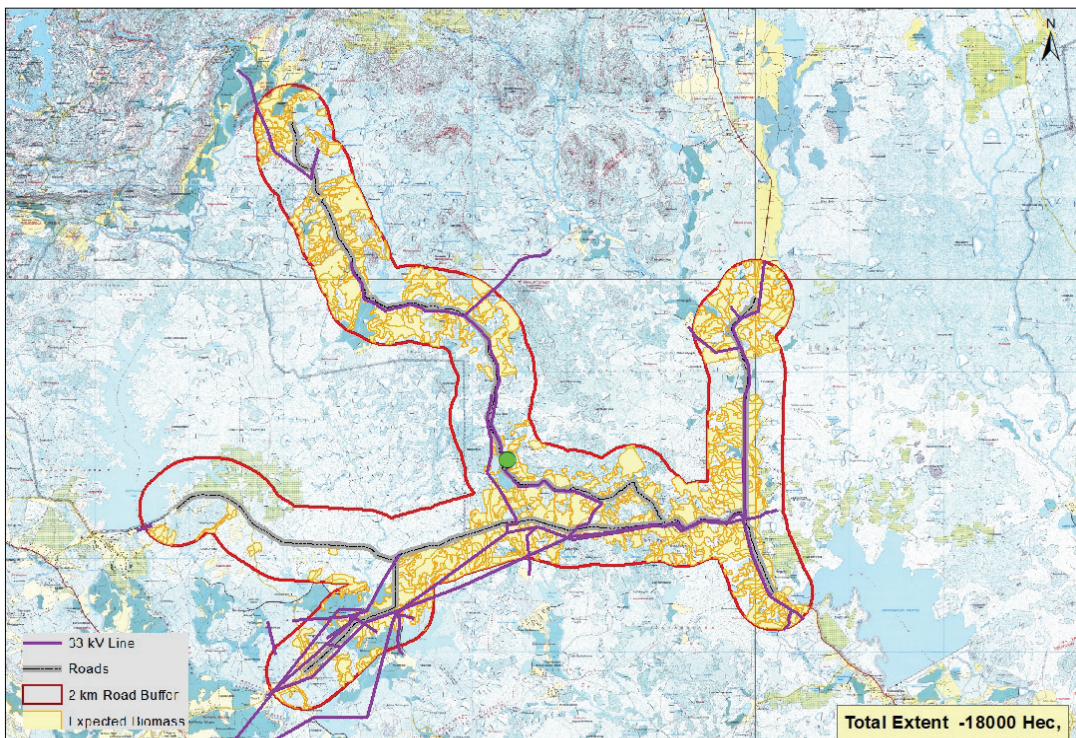
Site details of 0.5 MW biomass power plant at Maha Wewa, Thanamalwila

Name of the GN Division - Maha Wewa
Divisional secretariat - Thanamalvila
District - Monaragala
Nearest town - Embilipitiya

Coordinates of the sites -
6°27'38.2"N 81°00'53.1"E
Land area: 2.3 Ha
Distance to nearest town: 15.9 km

Site description: Thanamalvila site is located by the side of Maha Wewa, 12 km toward Hambegamuwa from Bodagama Junction along Bodagama, Hambegamuwa, Kalthota road (B521). The site is almost flat and it is an abundant Chena land with 2.5 acre. The 33kVA primary distribution line is running by the side of this land.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 18000 Ha
Biomass availability: 95 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.75MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Embilipitiya

Water availability: taken from Maha Wewa near by

No. 10

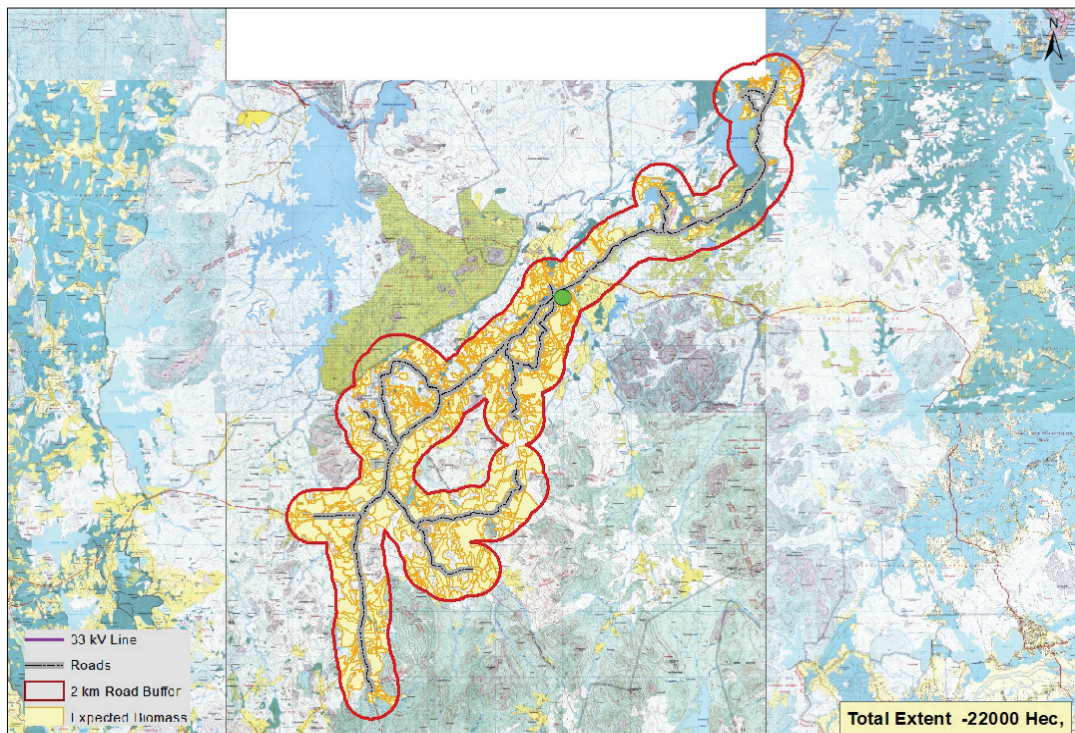
Cumulative Capacity - 8.0MW

Site details of 1.0 MW biomass power plant at Maha Oya, Ampara

Name of the GN Division - Maha Oya
Divisional secretariat - Maha Oya
District - Ampara
Nearest town - Ampara

Coordinates of the sites -
7°31'51.3"N 81°21'38.5"E
Land area: 2.16 Ha
Distance to nearest town: 0.5km

Site description: Site is located 0.5km along the Rambaken an Oya Reservoir road from Maha Oya junction and by the side of Maha Oya. The 33kVA primary distribution line is running by the side of Rambaken Oya reservoir road and the grid connectivity is not an issue for this site.
Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 22000 Ha
Biomass availability: 120 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.2MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Ampara

Water availability: taken from Maha Oya nearby.

No. 11

Cumulative
Capacity - 9.0MW

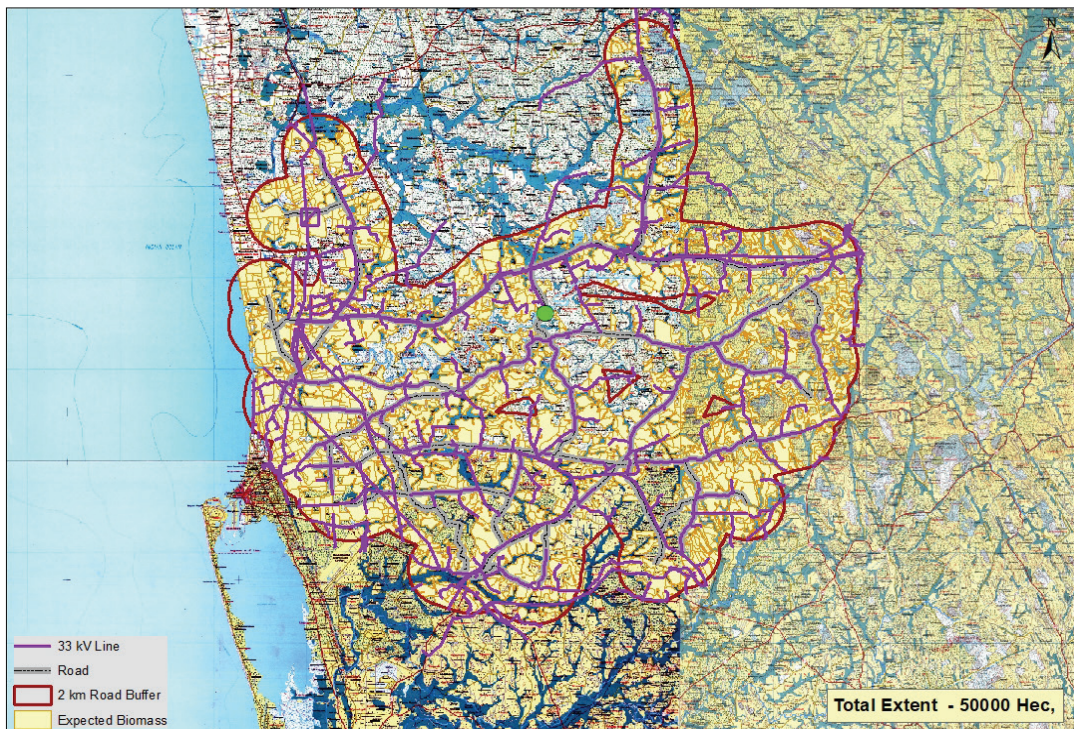
**Site details of 1.0 MW biomass power plant at
Badalgama, Makandura**

Name of the GN Division - Badalgama
Divisional secretariat - Divulapitiya
District - Gampaha
Nearest town - Makandura

Coordinates of the sites -
7°17'57.4"N 79°58'54.5"E
Land area: 3.0 Ha
Distance to nearest town: 2.7km

Site description: Site is located 2.7km towards Badalgama from Makandura along the Makandura-Badalgama road and by the side of Maha Oya. Since the Maha-Oya is close by, access to water is not a major issue for this site. The 33kVA distribution line is running by the side of Makandura-Badalgama road and the grid connectivity can be done with the minimum cost.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 50,000 Ha
Biomass availability: 270 tons/day
Equivalent plant capacity for steam turbine based power plant: 5.0MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Pannala

Water availability: taken from Maha Oya nearby.

35

No. 12

Cumulative Capacity
- 10.0MW

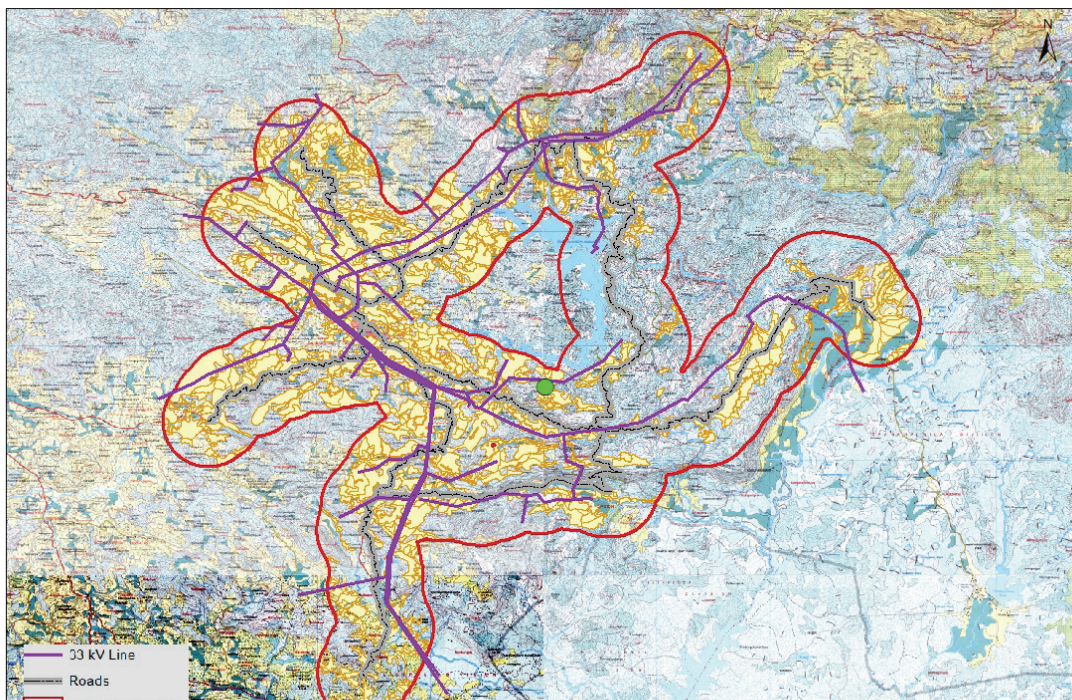
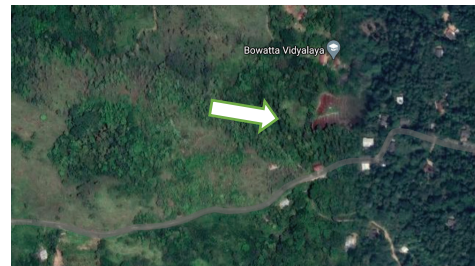
**Site details of 1.0 MW biomass power plant at
Hela-Bowaththa, Balangoda**

Name of the GN Division - Bowaththa
Divisional secretariat - Balangoda
District - Ratnapura
Nearest town - Balangoda

Coordinates of the sites -
6°39'1.51"N, 80°43'1.58"E
Land area: 1.5 Ha
Distance to nearest town: 10km

Site description: Site is located 1.5km away from Balangoda-Kataragama main road and 10km away from Balangoda town. The land is almost flat and need minor leveling before use. Ground water is available for general purpose and tube well is needed for boiler operation. Site is located western corner of the Bowaththa village.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 42000 Ha
Biomass availability: 225 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.3MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Balangoda

Water availability: taken from the tube wells.

36

No. 13

Cumulative Capacity
- 11.0MW

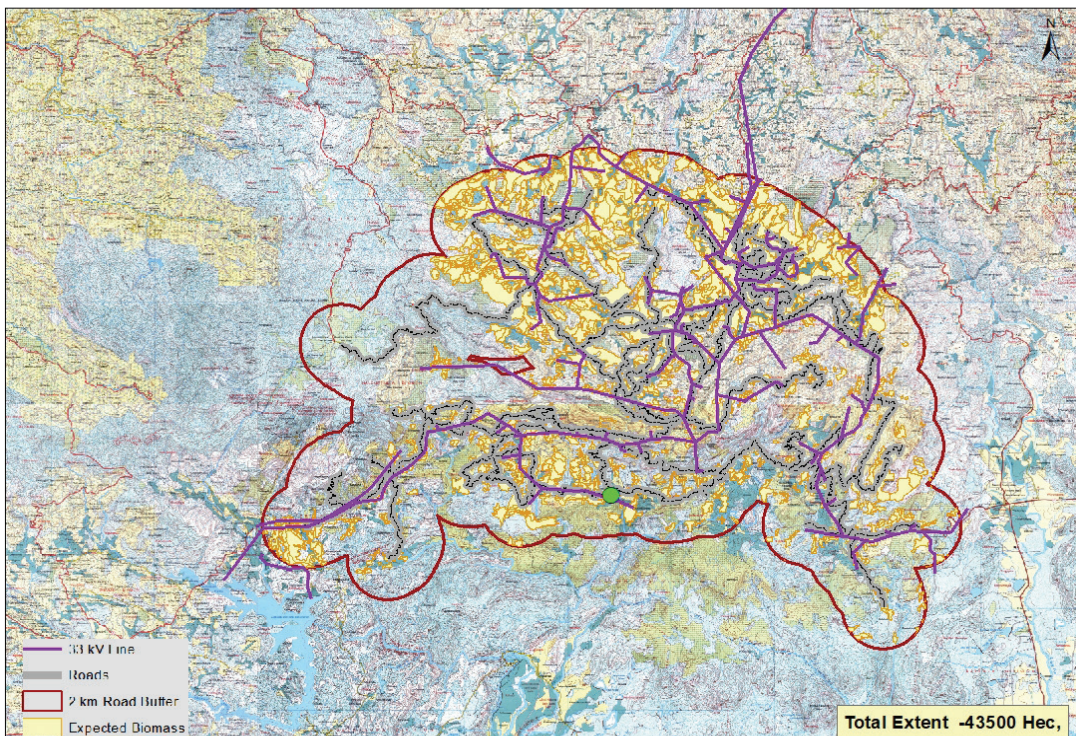
**Site details of 1.0 MW biomass power plant at
Manthenna, Beragala**

Name of the GN Division - Manthenna
Divisional secretariat - Haldummulla
District - Badulla
Nearest town - Beragala

Coordinates of the sites -
6°44'03.3"N 80°55'36.1"E
Land area: 1.6 Ha
Distance to nearest town: 15km

Site description: Site is located in Ellawala, Haldummulla, by the side of Blackwood-Kirawanagama road. Carpet road is available to the site from Colombo-Batticaloa highway running via Beragala, but avoid the movement of bigger vehicles due to slope and sharp bend available in this road.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 435000 Ha
Biomass availability: 230 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.4MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Balangoda

Water availability: From the water stream available by the side of this site

No. 14

Cumulative Capacity
- 12.0MW

**Site details of 1.0 MW biomass power plant at
Rideemaliyadda North, Andaulpotha**

Name of the GN Division - Rideemaliyadda
North
Divisional secretariat - Rideemaliyadda
District - Badulla
Nearest town - Andaulpotha

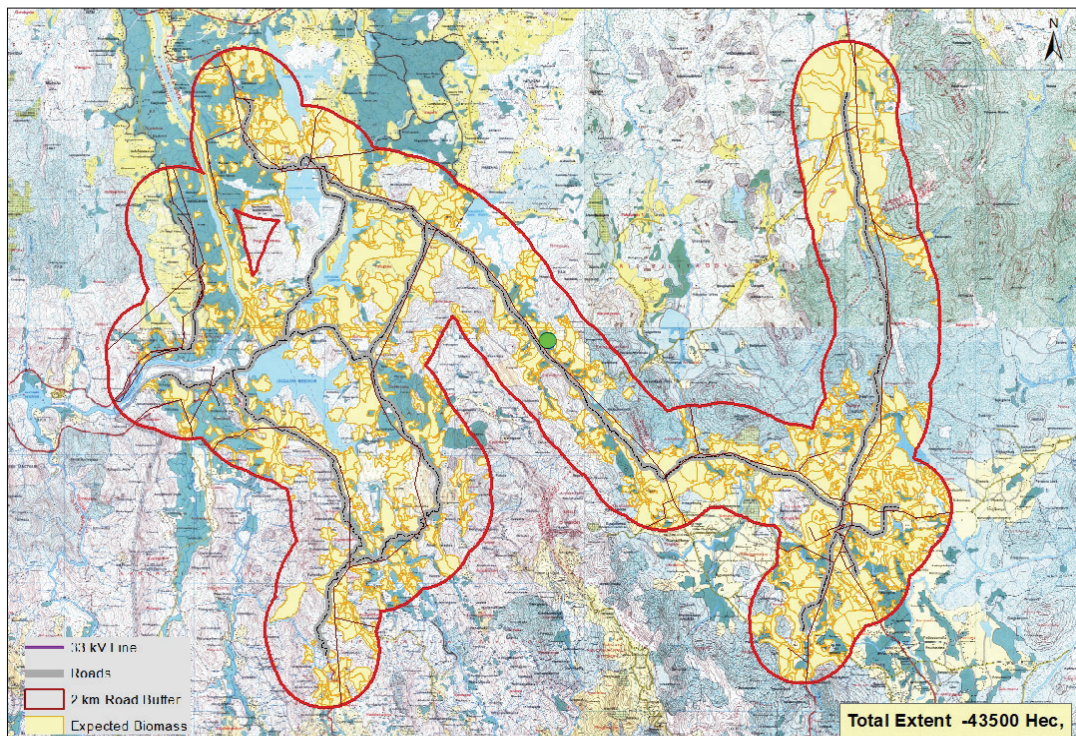
Coordinates of the sites -
7°13'19.3"N 81°07'16.7"E

Land area: 2.14 Ha

Distance to nearest town: 7km

Site description: Site is located by the side of Bibile-Uraniya-Mahiyangana road (B57). Hepola Oya is running by the side of this proposed site and there is no any difficulty obtaining water to this site. Three houses are nearby to the site and need to take in to account this factor when designing the power plant.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 43500 Ha
Biomass availability: 230 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.4MW

Distance between 33kVA primary distribution line and the site: 250m
Substation: Mahiyangana

Water availability: taken from Hepola Oya nearby.

38

No. 15

Cumulative Capacity
- 13.0MW

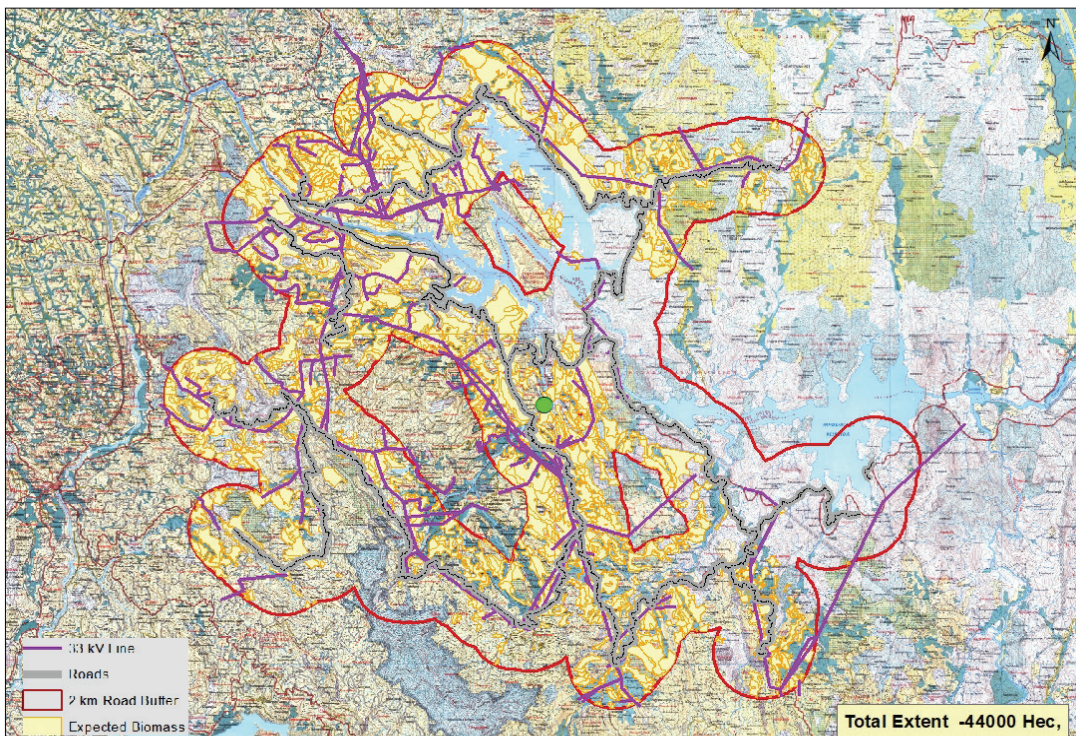
Site details of 1.0 MW biomass power plant at
Unuvinna East, Hanguranketha

Name of the GN Division - Unuvinna East
Divisional secretariat - Patha Hewaheta
District - Nuwara Eliya
Nearest town - Hanguranketha

Coordinates of the sites -
7°11'49.9"N 80°46'03.6"E
Land area: 1.36 Ha
Distance to nearest town: 5km

Site description: Site is located 0.5km along the Unuvinna road from Ma Oya junction at the Thalathuoya-Marassana road and by the side of Ma-Oya. Distance to the 33kVA primary distribution line would be around 2km from the site. Water requirement for this site can be easily meet from the Ma Oya.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 44000 Ha
Biomass availability: 240 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.5MW

Distance between 33kVA primary distribution line and the site: 800m
Substation: Nuwara Eliya

Water availability: taken from Ma Oya nearby.

No. 16

Cumulative Capacity
- 14.0MW

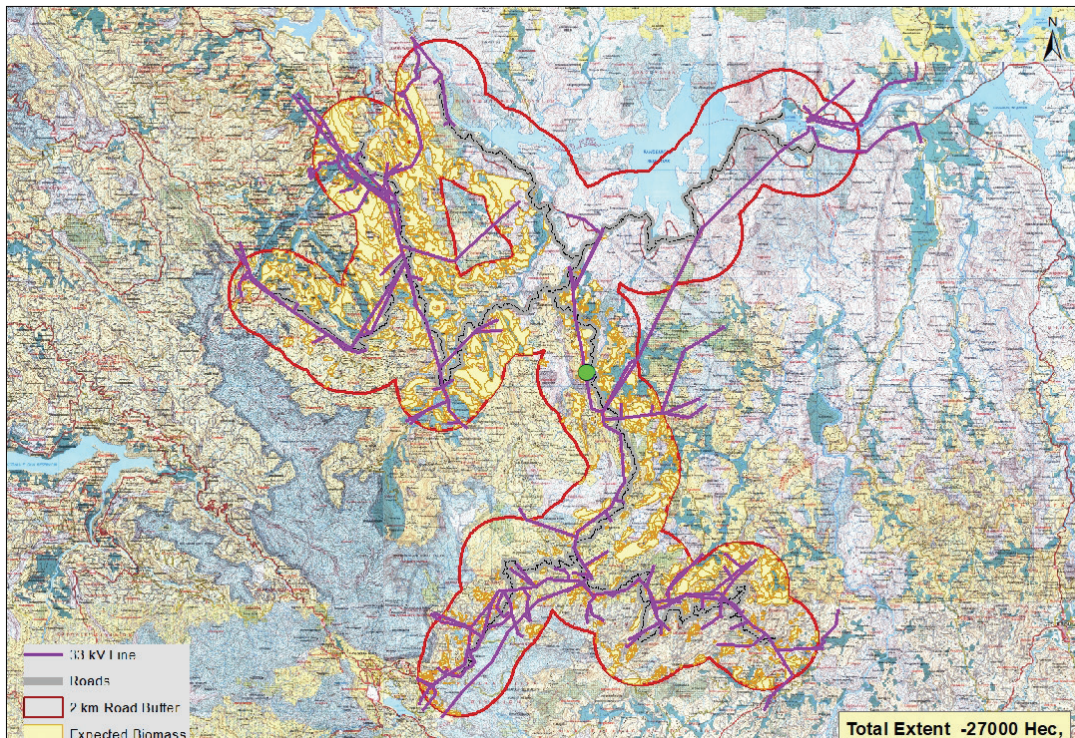
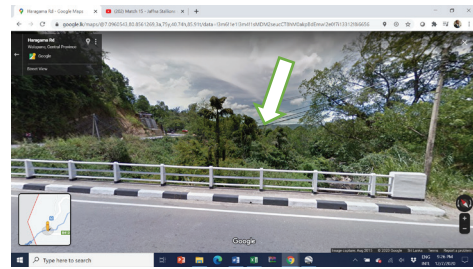
**Site details of 1.0 MW biomass power plant at
Thennehenawala, Walapane**

Name of the GN Division - Thennehenwala
Divisional secretariat - Walapane
District - Nuwara Eliya
Nearest town - Walapane

Coordinates of the sites -
7.096914, 80.856779
Land area: 1.0 Ha
Distance to nearest town: 2.0km

Site description: Site is located by the side of Haragama road (B413) and by the side of Kurundu Oya. This is not a flat land and the slope to the horizontal is around 30°. Since the Walapane area consists of mountains, hills and slopes in geographically, finding a suitable land full filling all the requirement is difficult.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 22000 Ha
Biomass availability: 120 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.2MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Ampara

Water availability: taken from Maha Oya nearby.

40

No. 17

Cumulative Capacity
- 14.5MW

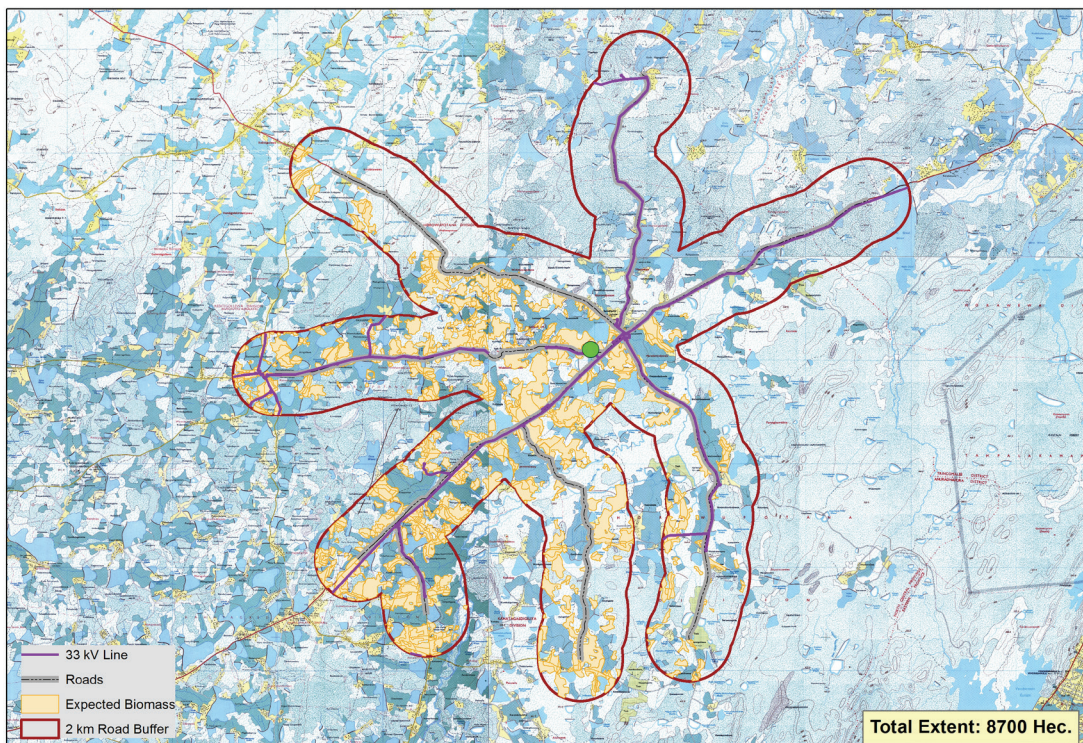
**Site details of 0.5 MW biomass power plant at
Medawachchi Handiya, Horowpothana**

Name of the GN Division - Medawachchi
Handiya
Divisional secretariat - Horowpothana
District - Anuradhapura
Nearest town - Horowpothana

Coordinates of the sites -
8°32'33.7"N 80°48'56.0"E
Land area: 4.71 Ha
Distance to nearest town: 1.37km

Site description: Site is located 800m away from the Anuradhapura-Trincomalee highway and by the side of Medawachchiya-Horowpothana road (B282). The land is almost flat and water tank is available by the side of this land and access to water is no a major issue.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 8700 Ha
Biomass availability: 46 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.8MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Trincomalee

Water availability: taken from the water tank nearby.

No. 18

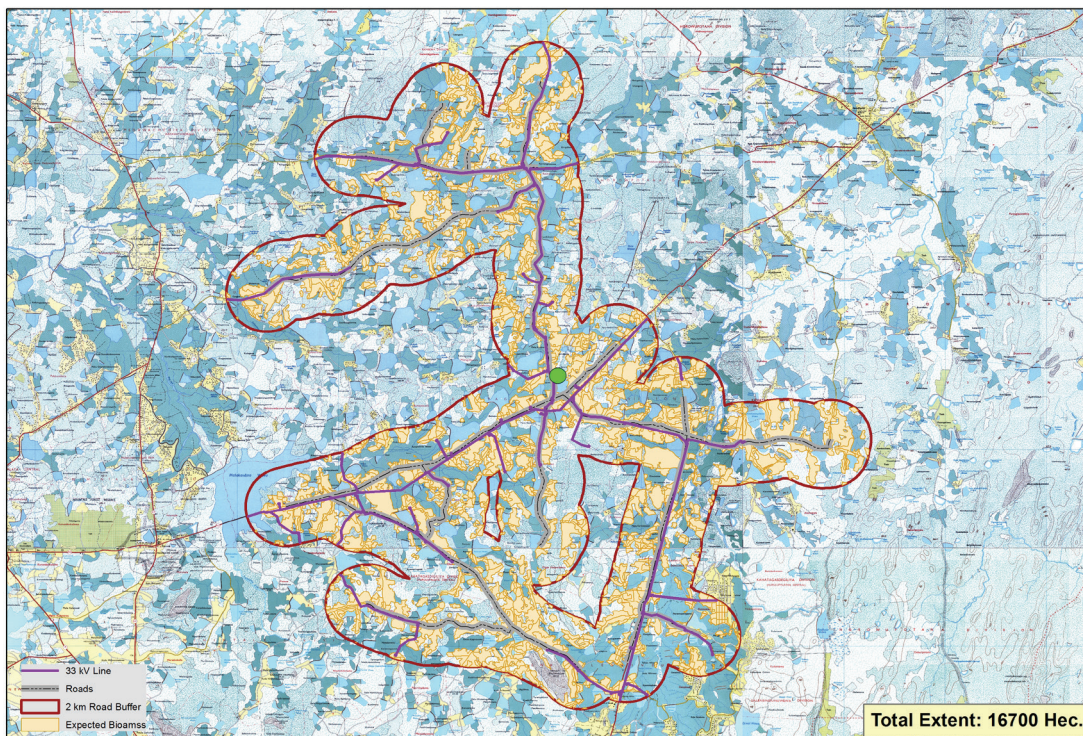
Cumulative Capacity
- 15.5MW

**Site details of 1.0 MW biomass power plant at
Kahatagasdigiliya West, Kahatagasdigiliya**

Name of the GN Division - Kahatagasdigiliya
West
Divisional secretariat - Kahatagasdigiliya
District - Anuradhapura
Nearest town - Kahatagasdigiliya

Coordinates of the sites -
8°26'10.9"N 80°41'19.0"E
Land area: 1.9Ha
Distance to nearest town: 1.1km

Site description: Site is located by the side of Rathmalgahawewa-Kivulekade-Kahatagasdigiliya road and 1.1km away from Kahatagasdigiliya town. The land is almost flat and water tank is available by the side of this land and access to water is no a major issue. The 33kVA primary distribution line is available by the side of the road.
Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 16700 Ha
Biomass availability: 90 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.7MW

Distance between 33kVA primary distribution line and the site: 200m
Substation: Anuradhapura

Water availability: taken from the water tank nearby.

42

No. 19

Cumulative Capacity
- 16.5MW

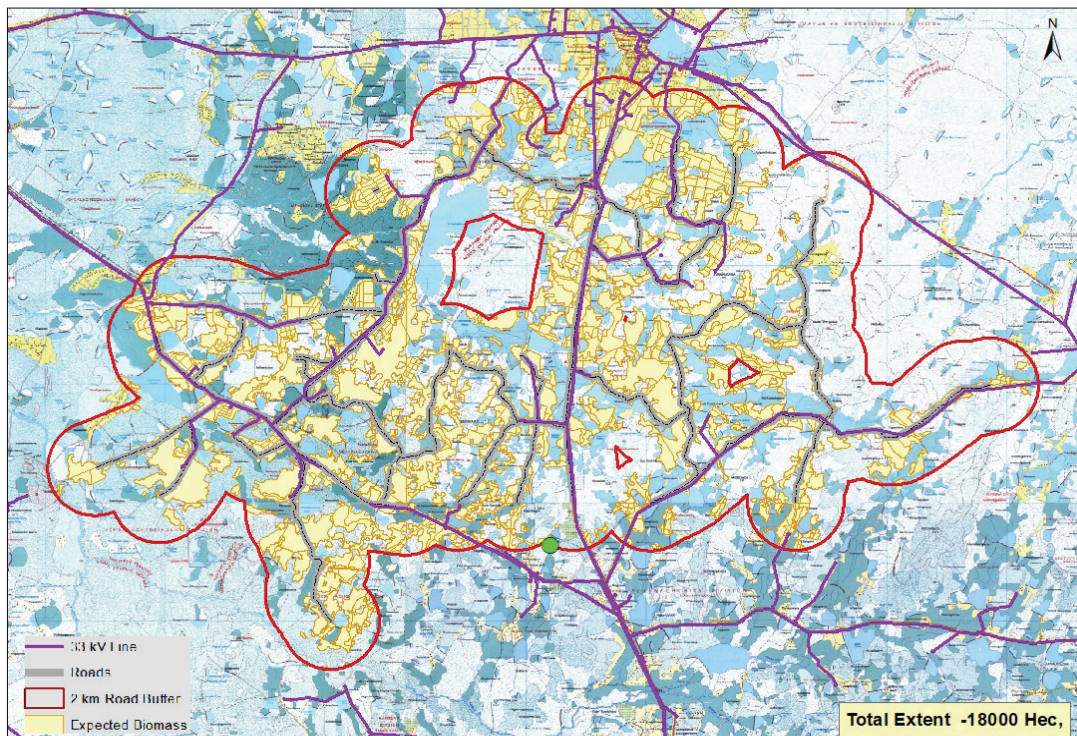
**Site details of 1.0 MW biomass power plant at
Walpola, Medawachchiya**

Name of the GN Division - Walpola
Divisional secretariat - Medawachchiya
District - Anuradhapura
Nearest town - Medawachchiya

Coordinates of the sites -
8°32'51.8"N 80°27'58.0"E
Land area: 1.0 Ha
Distance to nearest town: 2.0km

Site description: Site is located 600m along the Walpola road from Medawachchiya-Talaimannar highway (A4) and 4km away from Medawachchiya town. The land is almost flat and water tank is available by the side of this land and access to water is no a major issue. The 33kVA primary distribution line is available by the side of the road.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 18000 Ha
Biomass availability: 96 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Vavuniya

Water availability: taken from the water tank nearby.

No. 20

Cumulative Capacity
- 17.5MW

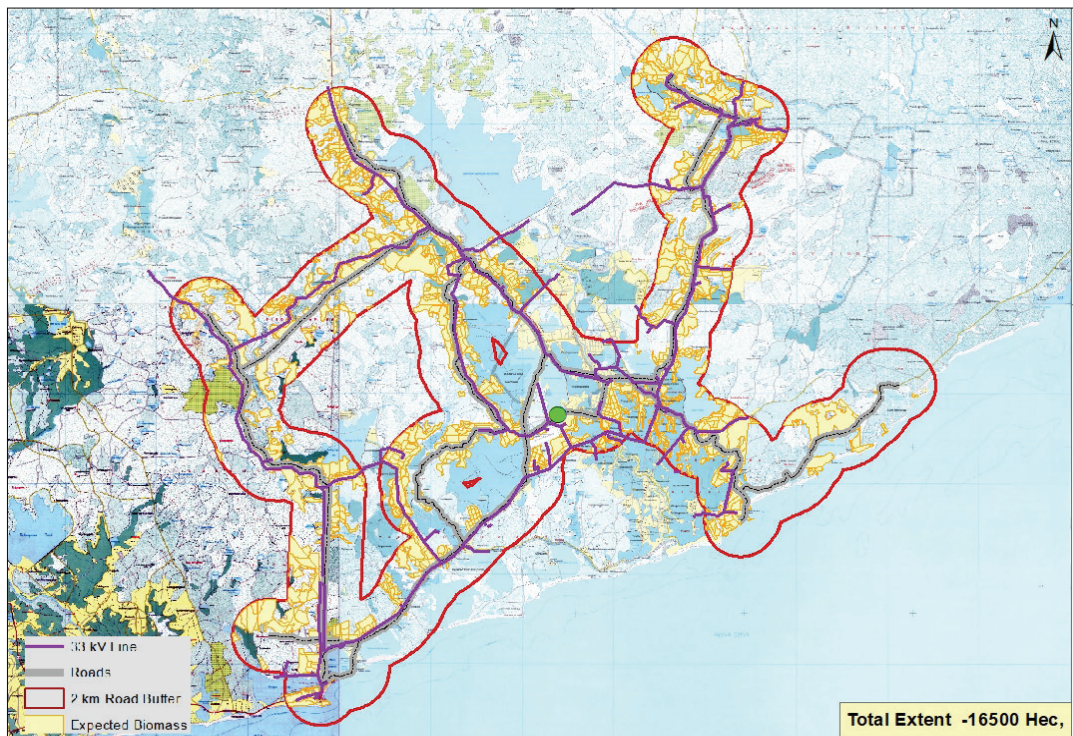
Site details of 1.0 MW biomass power plant at
Molekepoopathana, Tissamaharama

Name of the GN Division - Molakepoopathana
Divisional secretariat - Tissamaharama
District - Hambanthota
Nearest town - Tissamaharama

Coordinates of the sites -
6°15'58.5"N 81°14'28.3"E
Land area: 2.8 Ha
Distance to nearest town: 2.8km

Site description: Site is located by the side of Weerawila Lake and 2km along on the Andalla Tissa road from Weerawila Junction. The land is almost flat and need minor preparation. Water accessibility is there from Weerawila tank nearby and the grid accessibility is closed by.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 16500 Ha
Biomass availability: 90 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Hambanthota

Water availability: taken from Weerawila tank nearby.

44

No. 21

Cumulative Capacity
- 18.5MW

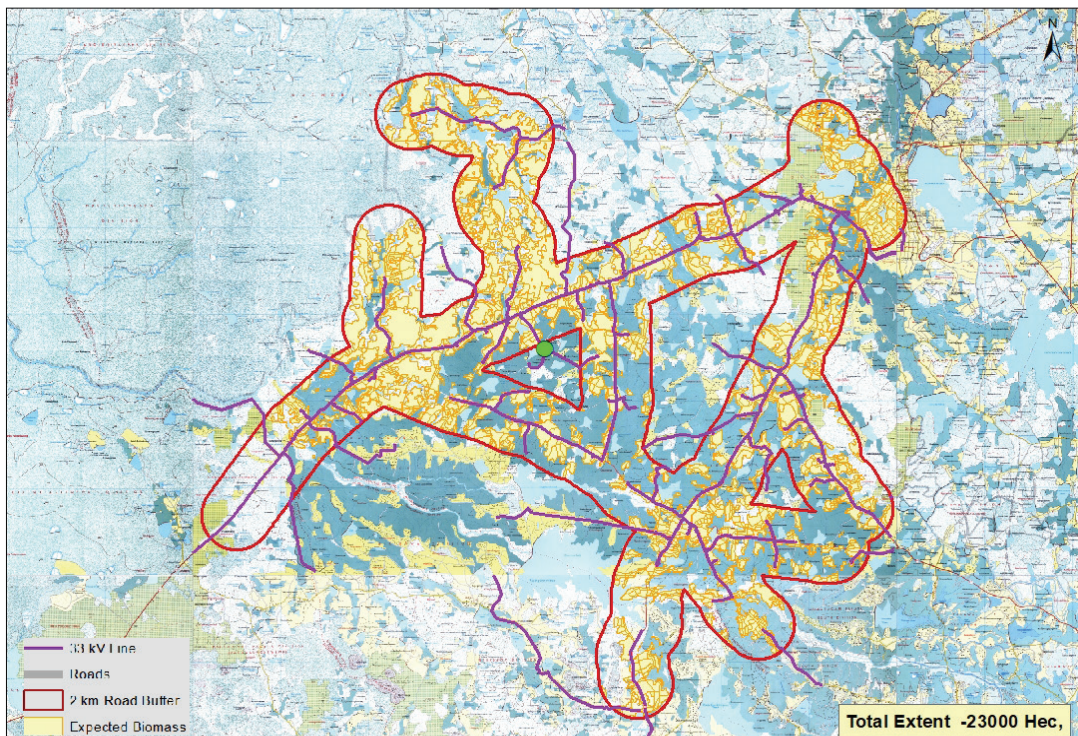
**Site details of 1.0 MW biomass power plant at
Halmillakulama, Nochchiyagama**

Name of the GN Division - Halmillakulama
Divisional secretariat - Nochchiyagama
District - Anuradhapura
Nearest town - Nochchiyagama

Coordinates of the sites -
8°15'7.22"N, 80°13'15.18"E
Land area: 3.2 Ha
Distance to nearest town: 2km

Site description: Site is located 1.8 km away from the Puttalam-Anuradhapura highway and closed to Olu Wewa. The land is almost flat and need minor preparation. Water accessibility is there from Olu Wewa tank. The distance to the grid interconnection point is 800.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 23000 Ha
Biomass availability: 125 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.4MW

Distance between 33kVA primary distribution line and the site: 800m
Substation: Anuradhapura

Water availability: taken from Olu Wewa tank nearby.

45

No. 22

Cumulative Capacity
- 19.5MW

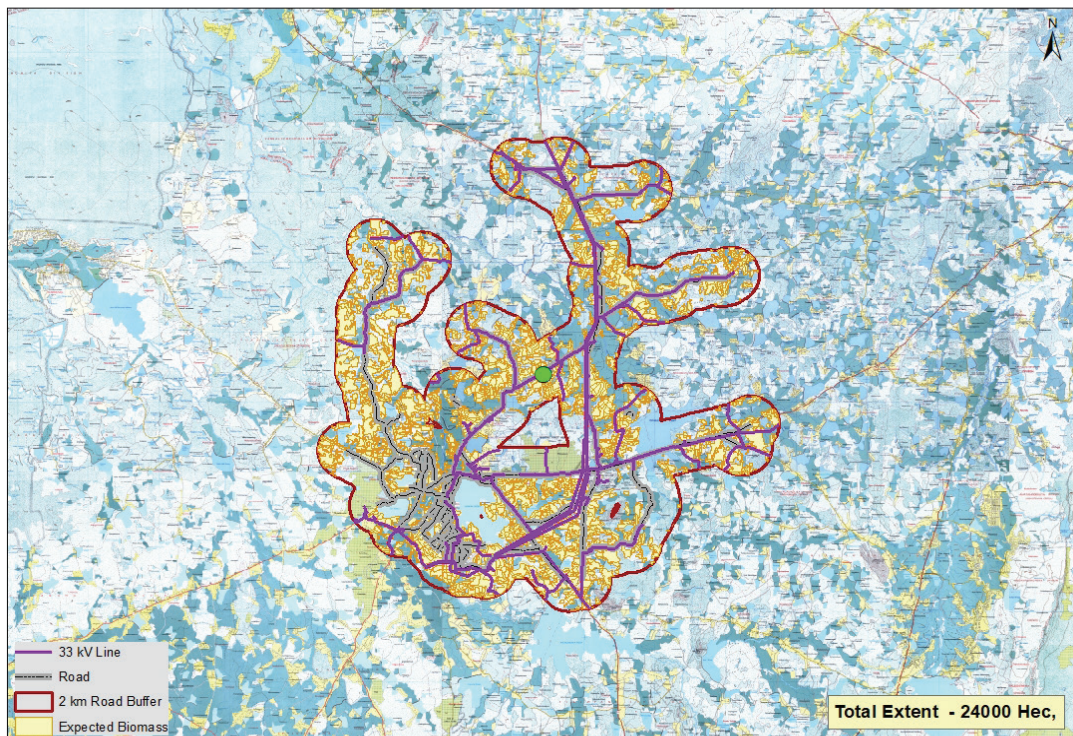
**Site details of 1.0 MW biomass power plant at
Ukkulankulama, Rambewa**

Name of the GN Division - Ukkulankulama
Divisional secretariat - Mihinthale
District - Anuradhapura
Nearest town - Rambewa

Coordinates of the sites -
8°24'58.85"N, 80°29'10.99"E
Land area: 2.44 Ha
Distance to nearest town: 4.6km

Site description: Site is located 1.6km towards Doramadala village from Anuradhapura-Rambewa road (A20). Also this site is close to Sangilikulama Wewa and Siyambalawa Wewa. This site is almost flat and both water supply and grid interconnection facility is available close by to this site.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 24,000 Ha
Biomass availability: 130 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.4MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Anuradhapura

Water availability: taken from water tanks nearby.

No. 23

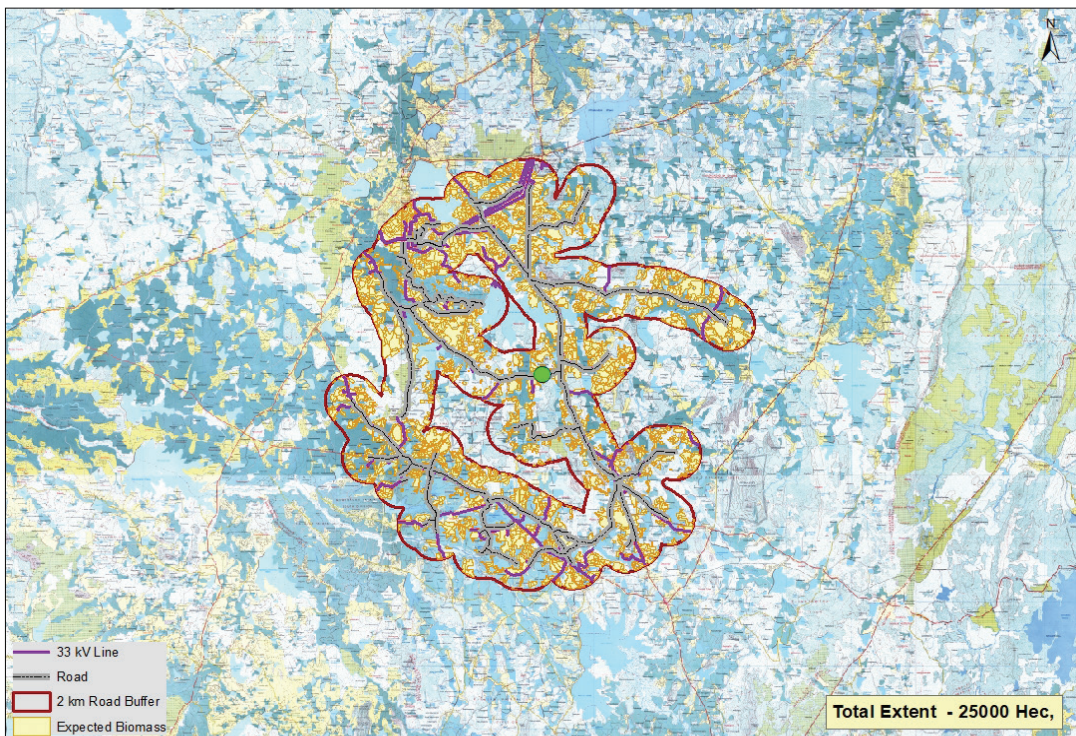
Cumulative Capacity
- 20.5MW

**Site details of 1.0 MW biomass power plant at
Sembukulama, Mihinthale**

Name of the GN Division - Sembukulama
Divisional secretariat - Thirappane
District - Anuradhapura
Nearest town - Mihinthale

Coordinates of the sites -
8°12'08.5"N 80°30'29.8"E
Land area: 2.5 Ha
Distance to nearest town: 20km

Site description: Site is located 1.5km along on the Thuruwila road from Thirappane junction towards Punchikulama. This is an abandon agriculture and considering the availability water, grid interconnection facility and road network, this site has been selected for this proposed project.
Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 25,000 Ha
Biomass availability: 135 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.5MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Anuradhapura

Water availability: taken from water tanks nearby.

No. 24

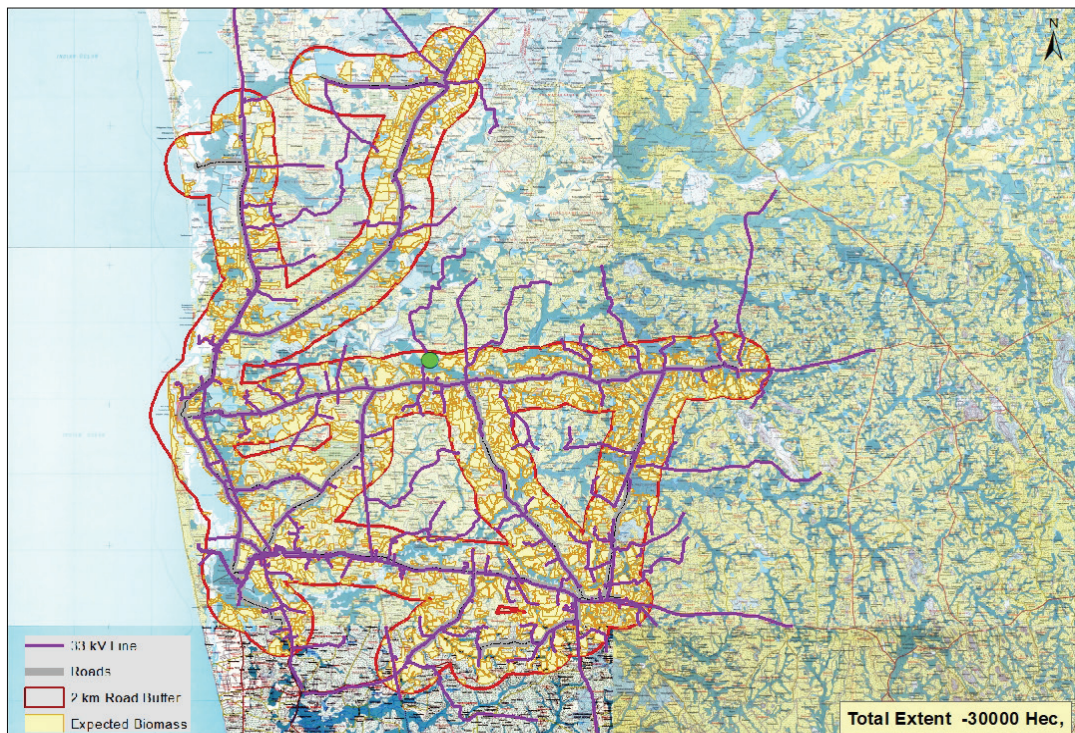
Cumulative Capacity
- 21.5MW

Site details of 1.0 MW biomass power plant at
Urapotha, Bingiriya

Name of the GN Division - Urapotha
Divisional secretariat - Bingiriya
District - Kurunegala
Nearest town - Bingiriya

Coordinates of the sites -
7°36'39.0"N 79°56'19.5"E
Land area: 1.5 Ha
Distance to nearest town: 2.85km

Site description: Site is located 1.5km along on the Urapotha road from Chilaw-Wariyapola road. There is a coconut plantation part of this land and other part is abundant due to less fertility. Also, this land is close by to the Kolamunu Oya and the water requirement can be meet from this source.
Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 30,000 Ha
Biomass availability: 160 tons/day
Equivalent plant capacity for steam turbine based power plant: 3.0MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: New Chilaw

Water availability: taken from Kolamunu Oya nearby.

48

No. 25

Cumulative Capacity
- 22.5MW

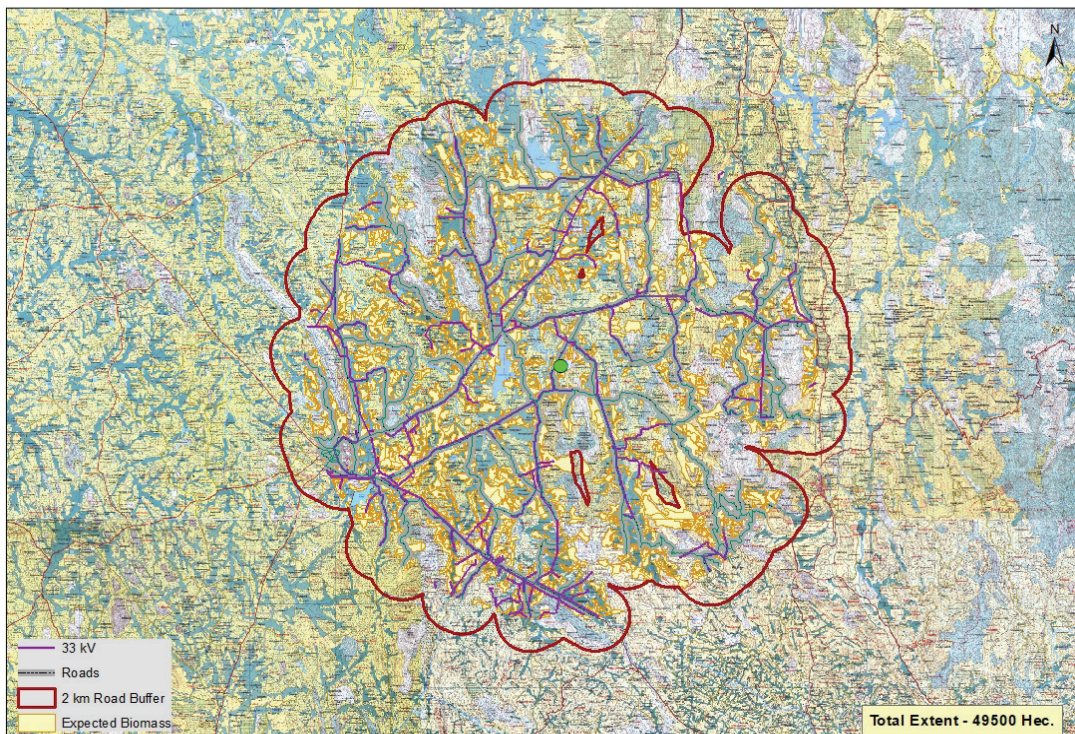
Site details of 1.0 MW biomass power plant at
Warakawehera, Dodangaslanda

Name of the GN Division - Warakawehera
Divisional secretariat - Rideegama
District - Kurunegala
Nearest town - Dodangaslanda

Coordinates of the sites -
7°32'04.0"N 80°28'59.6"E
Land area: 2.36 Ha
Distance to nearest town: 7km

Site description: Site is located by the side of the Mallawapitiya-Rambodagalla-Keppetigala road and close to the Warakawehera water tank. This is an abandon agriculture land and now is not being used.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 49500 Ha
Biomass availability: 265 tons/day
Equivalent plant capacity for steam turbine based power plant: 5.0MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Kurunegala

Water availability: taken from Warakawehera water tank nearby.

No. 26

Cumulative Capacity
- 23.5MW

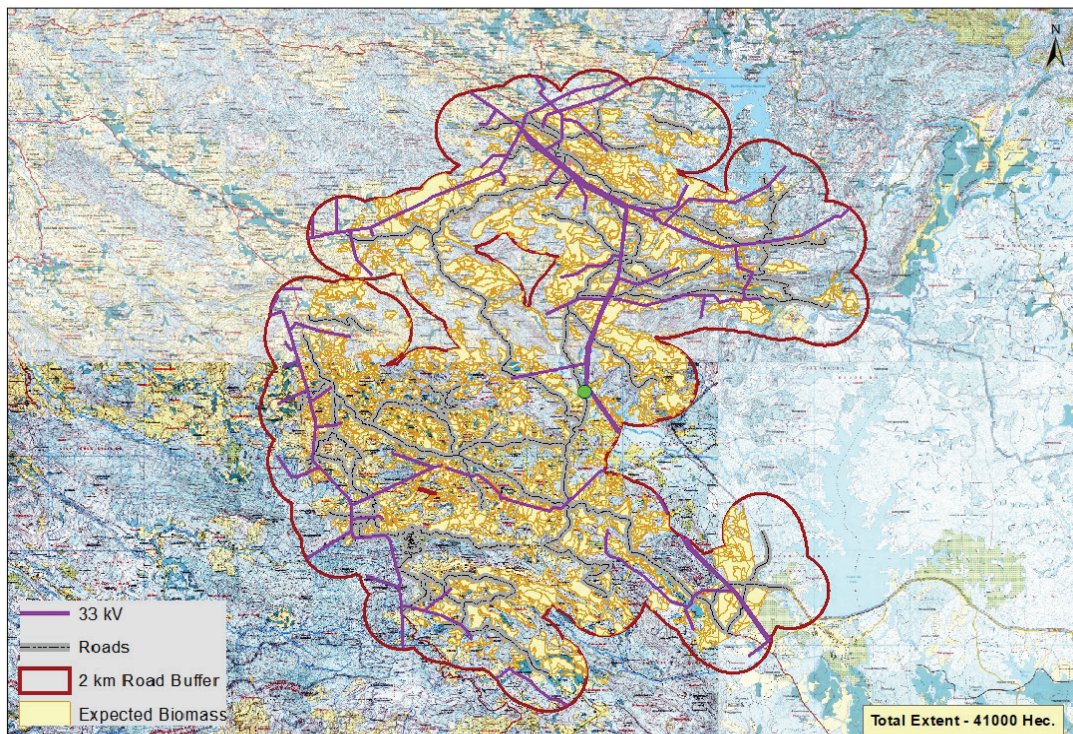
**Site details of 1.0 MW biomass power plant at
Thalagaskanda, Pallebadda**

Name of the GN Division - Thalagaskanda
Divisional secretariat - Weligepola
District - Ratnapura
Nearest town - Pallebadda

Coordinates of the sites -
6°32'02.7"N 80°42'31.4"E
Land area: 1.28 Ha
Distance to nearest town: 7km

Site description: Site is located by the side of Balangoda-Weligepola-Pallebadda road (B351) and 1.7km towards Weligepola from Ambawila junction. This is a partially developed home garden with 1.3 hectare. Water stream is available by the side of this land and there is no any difficulty for accessing water to this site.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 41,000 Ha
Biomass availability: 220 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.2MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Balangoda

Water availability: taken from water stream nearby.

50

No. 27

Cumulative Capacity
- 24.0MW

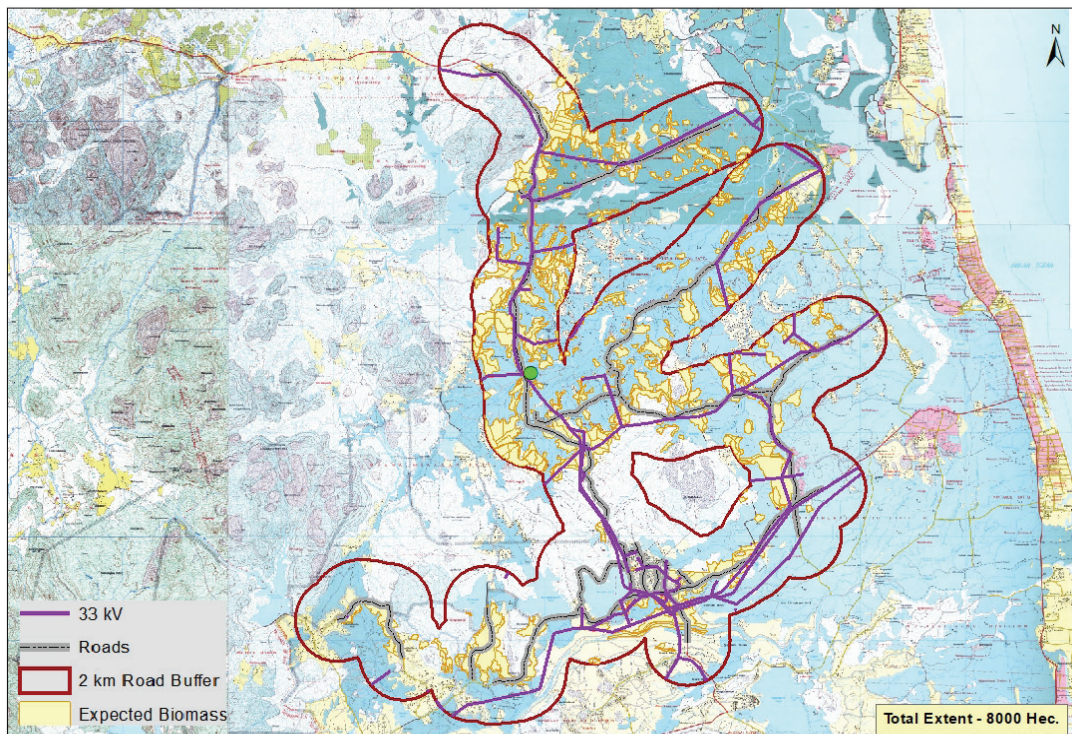
**Site details of 0.5 MW biomass power plant at
Verenketagoda, Uhana**

Name of the GN Division - Verenketagoda
Divisional secretariat - Uhana
District - Ampara
Nearest town - Uhana

Coordinates of the sites -
7°23'14.3"N 81°37'35.8"E
Land area: 2.19 Ha
Distance to nearest town: 3.5km

Site description: Site is located at Andal Oya junction and by the side of both Ampara-Uhana-Maha Oya road and Andal Oya. This is flat land and accessibility for water is available both side of this land. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 8000 Ha
Biomass availability: 43 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Ampara

Water availability: taken from Andal Oya nearby.

51

No. 28

Cumulative Capacity
- 24.5MW

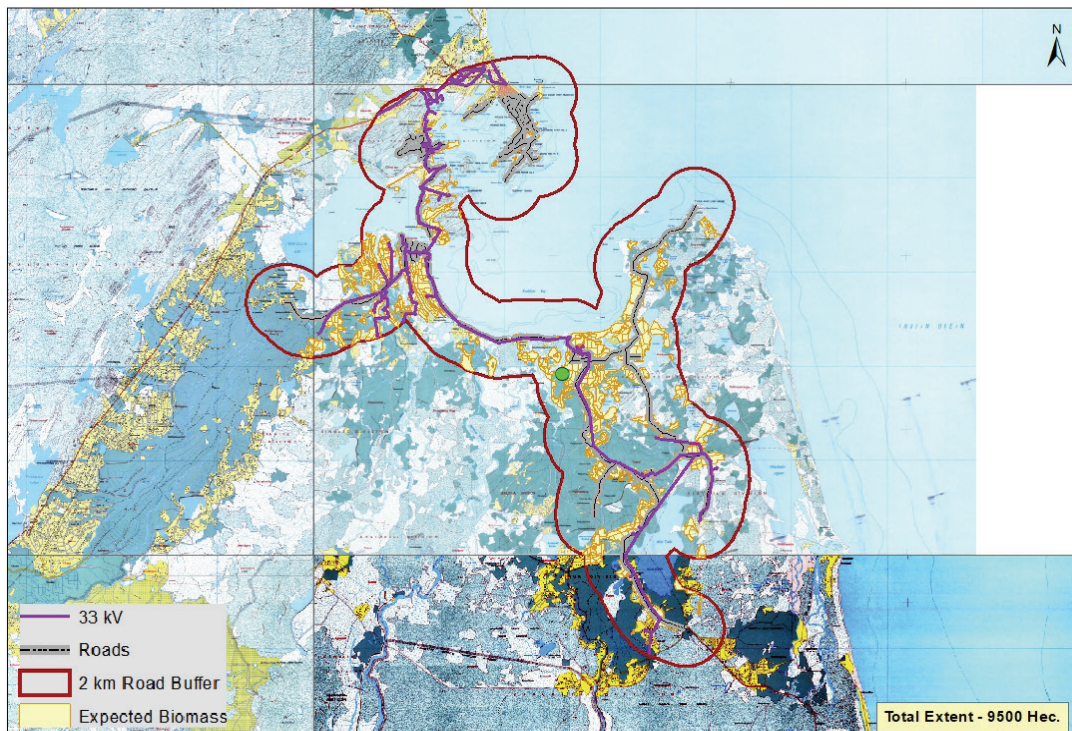
**Site details of 0.5 MW biomass power plant at
Periyapalam, Mutur**

Name of the GN Division - Periyapalam
Divisional secretariat - Mutur
District - Trincomalee
Nearest town - Mutur

Coordinates of the sites -
8.443622, 81.253060
Land area: 3.44 Ha
Distance to nearest town: 3.13km

Site description: Site is located by the side of Trincomalee highway (A15) and close to river Mahaweli delta. The land is almost flat and accessibility for water is available from the river Mahaweli close by. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 9500 Ha
Biomass availability: 50 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.9MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Trincomalee

Water availability: taken from river Mahaweli nearby.

52

No. 29

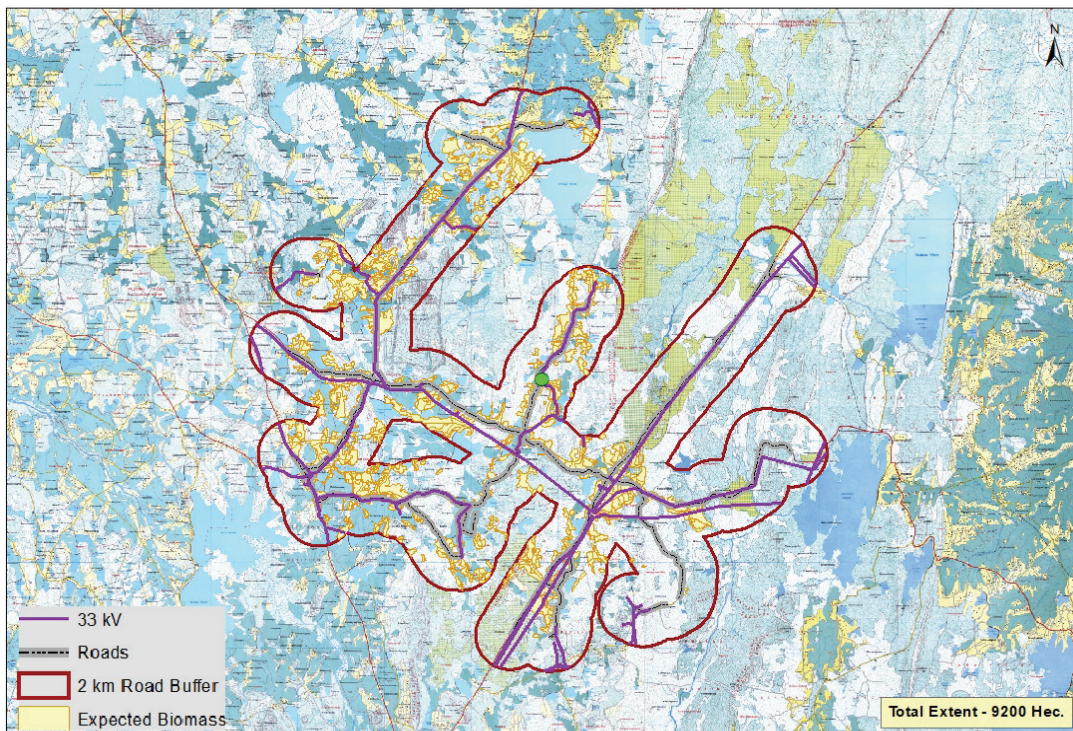
Cumulative Capacity
- 25.0MW

**Site details of 0.5 MW biomass power plant at
Weragala, Kumbukwewa, Habarana**

Name of the GN Division - Kumbukwewa
Divisional secretariat - Palugaswewa
District - Anuradhapura
Nearest town - Habarana

Coordinates of the sites -
8.091837, 80.717864
Land area: 2.71 Ha
Distance to nearest town: 9.75km

Site description: Site is located 3.5 km towards Weragala Rajamaha Viharaya from Palugaswewa junction along Palugaswewa-Weragala main road. The site is abandon Chena land and the Weragala water tank is close by and the access to water to this project is not an issue
Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 9200 Ha
Biomass availability: 50 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.9MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Habarana

Water availability: taken from the Weragala water tank nearby.

No. 30

Cumulative Capacity
- 26.0MW

**Site details of 1.0 MW biomass power plant at
Dummalasooriya, Udubaddawa**

Name of the GN Division - Dummalasooriya
Divisional secretariat - Udubaddawa
District - Kurunegala
Nearest town - Madampe

Coordinates of the sites -
7.484959, 79.907600
Land area: 2.5 Ha
Distance to nearest town: 8.3km

Site description: Site is located by the side of Karambalan Oya and close to new Chilaw grid substation. This is a partially developed coconut land but the coconut yield is very low and better to use for a development project like this. The CEB grid substation and the water availability is close by to this location.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 28000 Ha
Biomass availability: 150 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: New Chilaw substation

Water availability: taken from Karambalan Oya nearby.

54

No. 31

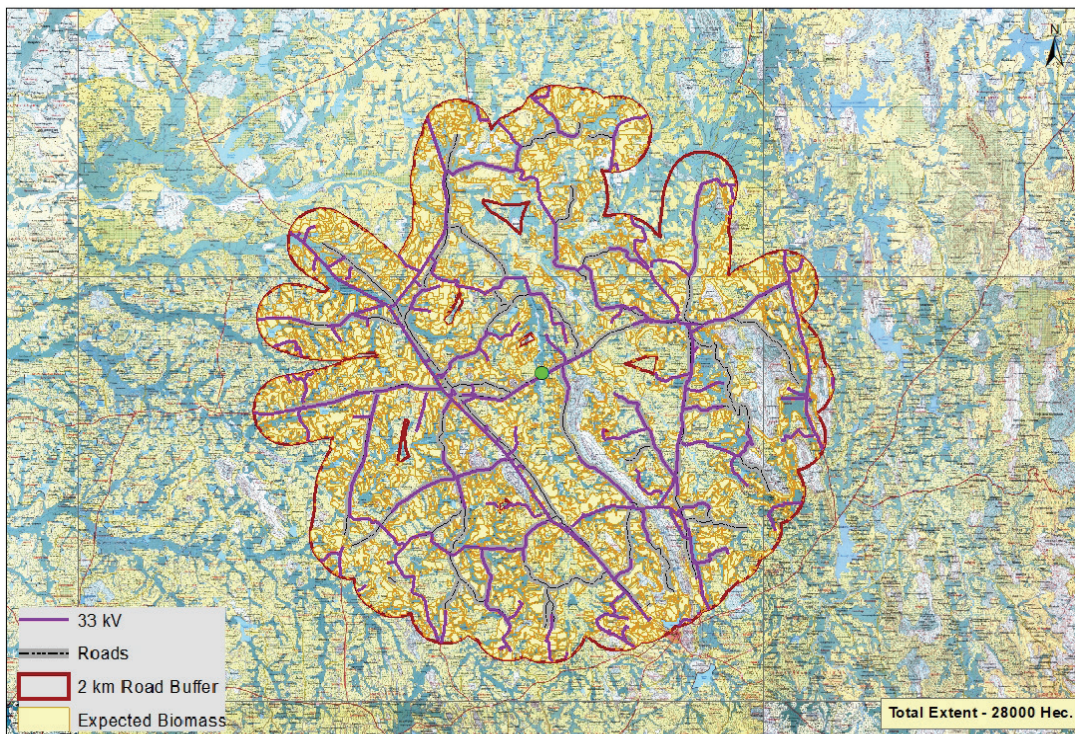
Cumulative Capacity
- 27.0MW

**Site details of 1.0 MW biomass power plant at
Wavegedara, Wariyapola**

Name of the GN Division - Wavegedara
Divisional secretariat - Waruyapola
District - Kurunegala
Nearest town - Wariyapola

Coordinates of the sites -
7.626829, 80.292059
Land area: 1.7 Ha
Distance to nearest town: 5.25km

Site description: Site is located by the side of Wariyapola-Ganewatta-Kumbukgate road and close to Maguru oya. This is a partially developed coconut land but the coconut yield is very low and better to use for a development project like this. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.
Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 28000 Ha
Biomass availability: 150 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Kurunegala

Water availability: taken from Maguru Oya nearby.

No. 32

Cumulative Capacity
- 27.5MW

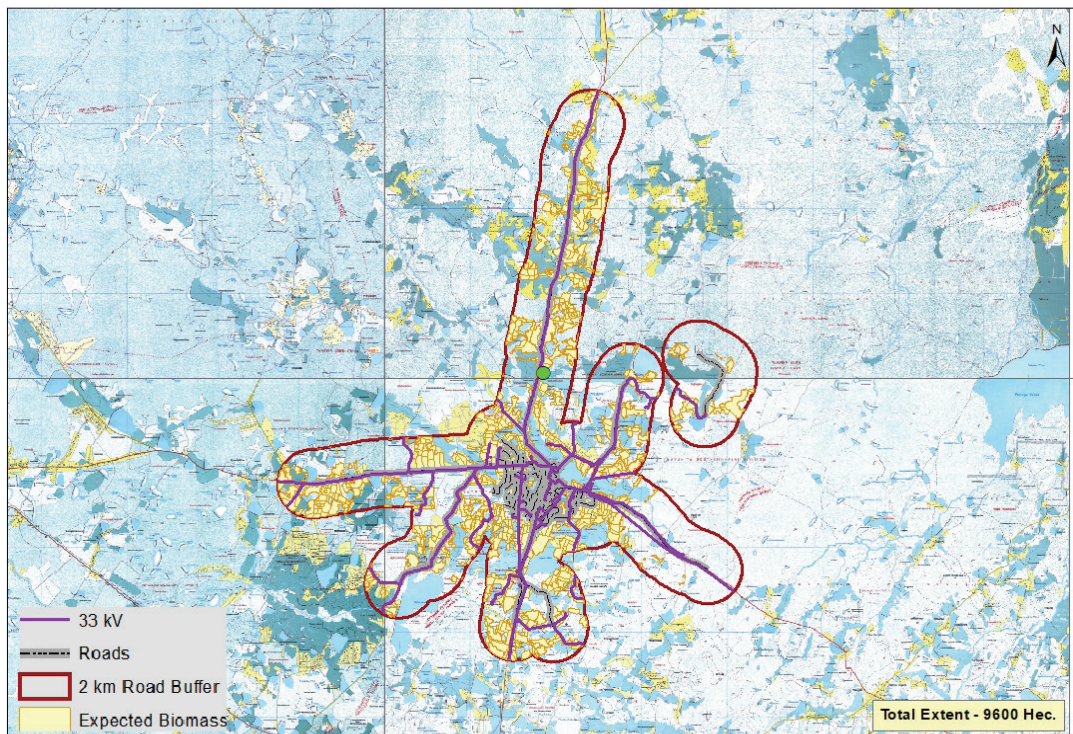
**Site details of 0.5 MW biomass power plant at
Nochchimodai, Vavuniya**

Name of the GN Division - Nochchimodai
Divisional secretariat - Vavuniya North
District - Vavuniya
Nearest town - Vavuniya

Coordinates of the sites -
8.811462, 80.492635
Land area: 2.75 Ha
Distance to nearest town: 6.7km

Site description: Site is located by the side of Kandy-Jaffna highway, 6.7km away from Vavuniya town. This is flat land and there is no any development project yet. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue. Water stream is available close by

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 9600 Ha
Biomass availability: 51 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.9MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Vavuniya

Water availability: taken from the water stream nearby.

56

No. 33

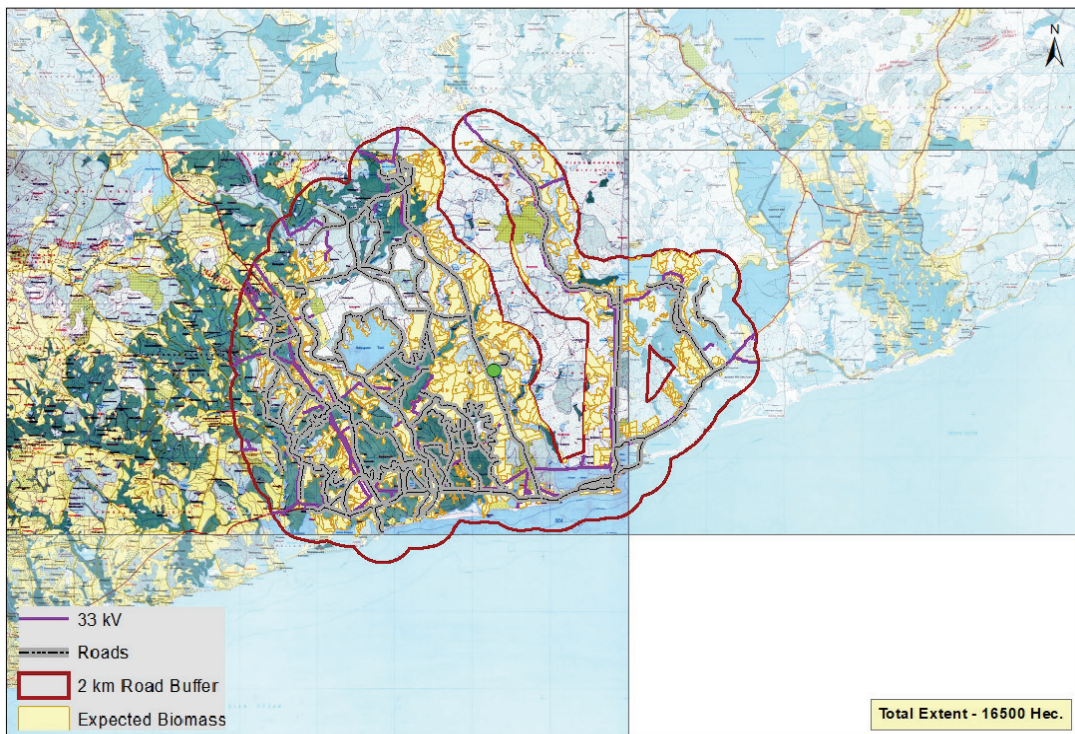
Cumulative Capacity
- 28.5MW

**Site details of 1 MW biomass power plant at
Mayurapura, Hambanthota**

Name of the GN Division - Bellagaswewa
Divisional secretariat - Hambanthota
District - Hambanthota
Nearest town - Sooryawewa

Coordinates of the sites -
6°11'31.5"N 81°03'17.9"E
Land area: 2.32 Ha
Distance to nearest town: 14.2km

Site description: Site is located in Mayurapura, by the side of Mirijjavila-Sooriyawewa road and close to go-ara Lake. This is a flat land and accessibility for water is available from the water tank close by. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.
Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 16500 Ha
Biomass availability: 88 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.65MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Hambanthota

Water availability: taken from Go-Ara Lake nearby.

No. 34

Cumulative Capacity
- 29.0MW

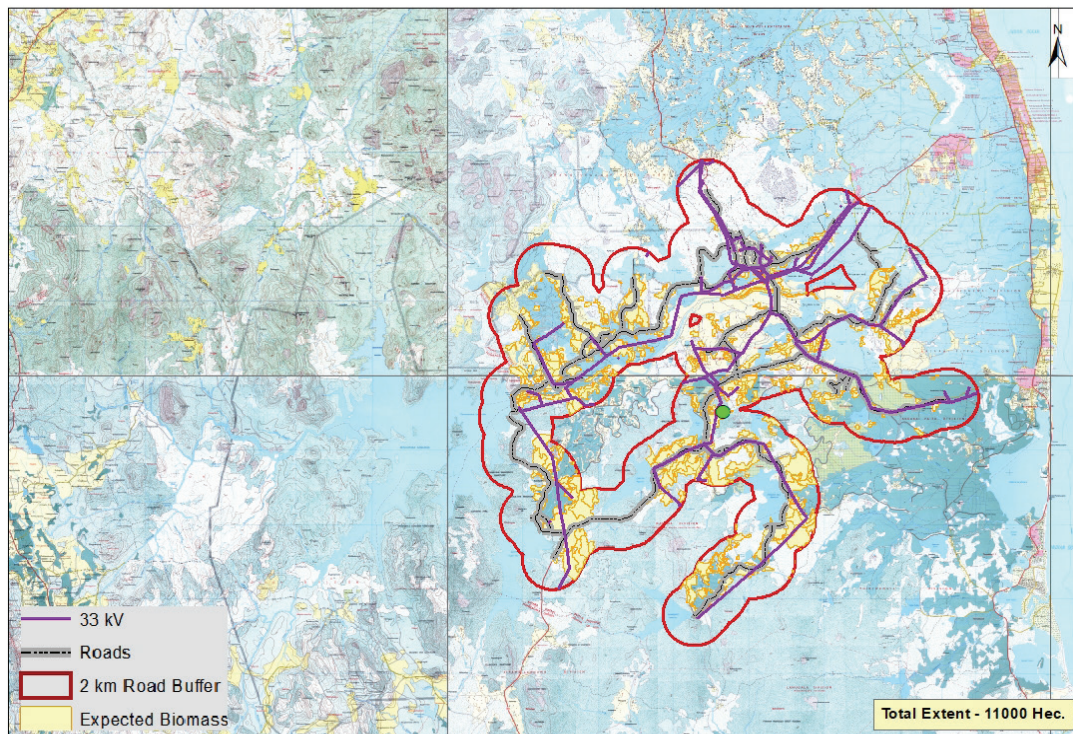
**Site details of 0.5 MW biomass Damana
Ampara**

Name of the GN Division - Damana
Divisional secretariat - Damana
District - Ampara
Nearest town - Damana

Coordinates of the sites -
7°12'12.6"N 81°39'40.7"E
Land area: 2.19 Ha
Distance to nearest town: 0.85km

Site description: Site is located by the side of Siyambalanduwa-Damana-Ampara highway and 850m towards Malayadi tank from Damana junction. This is flat land and accessibility for water is available both side of this land. The distance to 33kVA primary distribution line is around 850m from the site.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 11000 Ha
Biomass availability: 60 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.1MW

Distance between 33kVA primary distribution line and the site: 800m
Substation: Ampara

Water availability: taken from Malayadi tank nearby.

58

No. 35

Cumulative Capacity
- 30.0MW

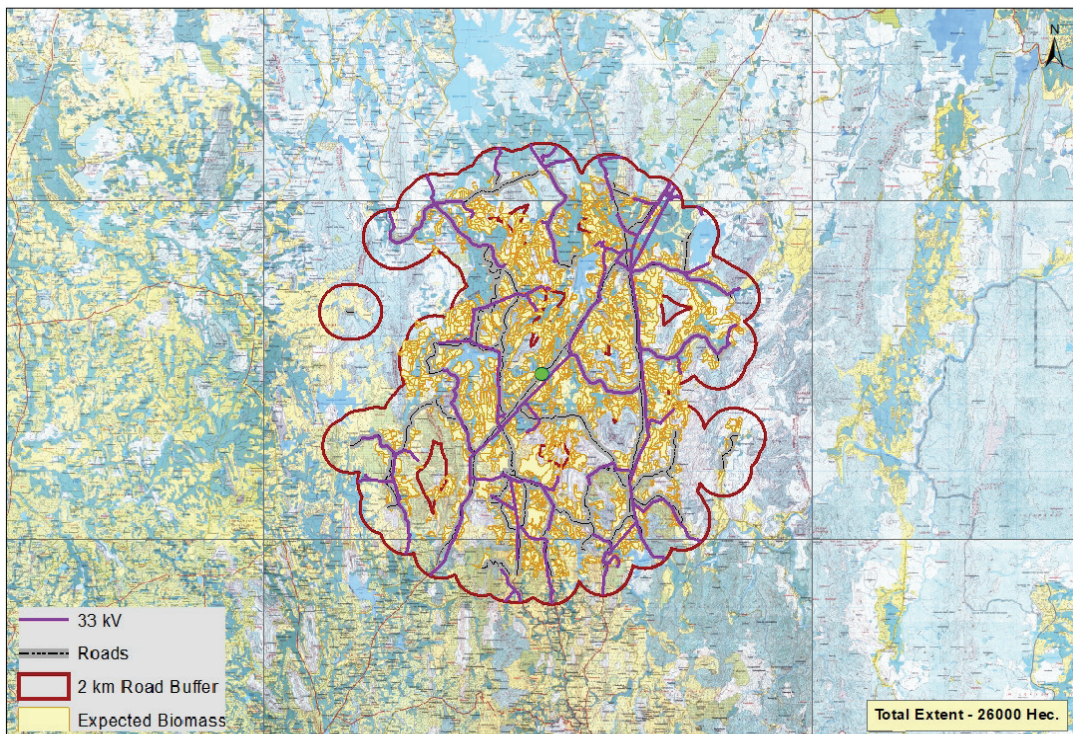
**Site details of 1 MW biomass power plant at
Silwathgama , Galewela**

Name of the GN Division - Silwathgama
Divisional secretariat - Dambulla
District - Matale
Nearest town - Galewela

Coordinates of the sites -
7.789294, 80.593340
Land area: 1.3 Ha
Distance to nearest town: 4.2km

Site description: Site is located in Galewela, by the side of Ambepussa-Kurunegala-Trincomalee highway. This is a partially developed coconut land. Water supply to the proposed project can be met from the water tank available close by. The distance to the 33kVA primary distribution line from the site is 300m.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 26000 Ha
Biomass availability: 140 tons/day
Equivalent plant capacity for steam turbine based power plant: 2.6MW

Distance between 33kVA primary distribution line and the site: 300m
Substation: Ampara

Water availability: taken from the water tank nearby.

No. 36

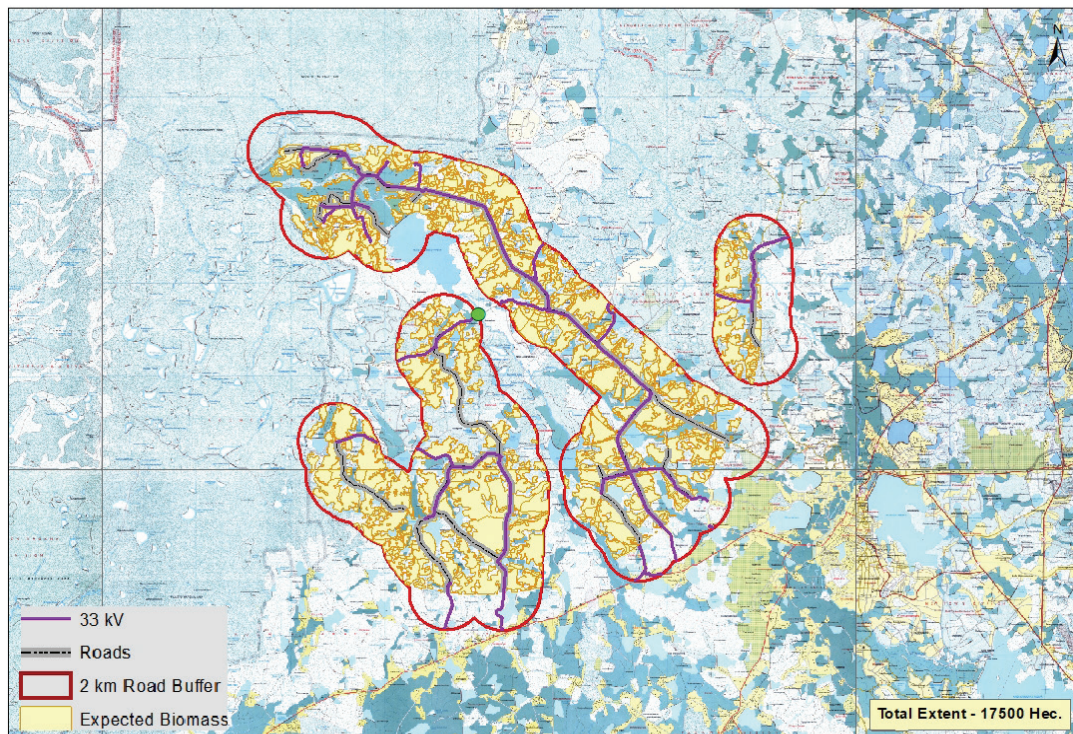
Cumulative Capacity
- 31.0MW

**Site details of 1MW biomass power plant at
Helambewa, Mahavilachchiya**

Name of the GN Division - Helambawewa
Divisional secretariat - Mahavilachchiya
District - Anuradhapura
Nearest town - Nochchiyagama

Coordinates of the sites -
8.431927, 80.226554
Land area: 5.2 Ha
Distance to nearest town: 18.1km

Site description: Site is located by the side of Nochchiyagama-Oyamaduwa road and close to Mahawilachchiya wewa. This is flat land and accessibility for water is available from the Mahavilachchiya tank. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.
Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 17500 Ha
Biomass availability: 95 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Anuradhapura

Water availability: taken from Mahavilachchiya tank nearby.

60

No. 37

Cumulative Capacity
- 32.0MW

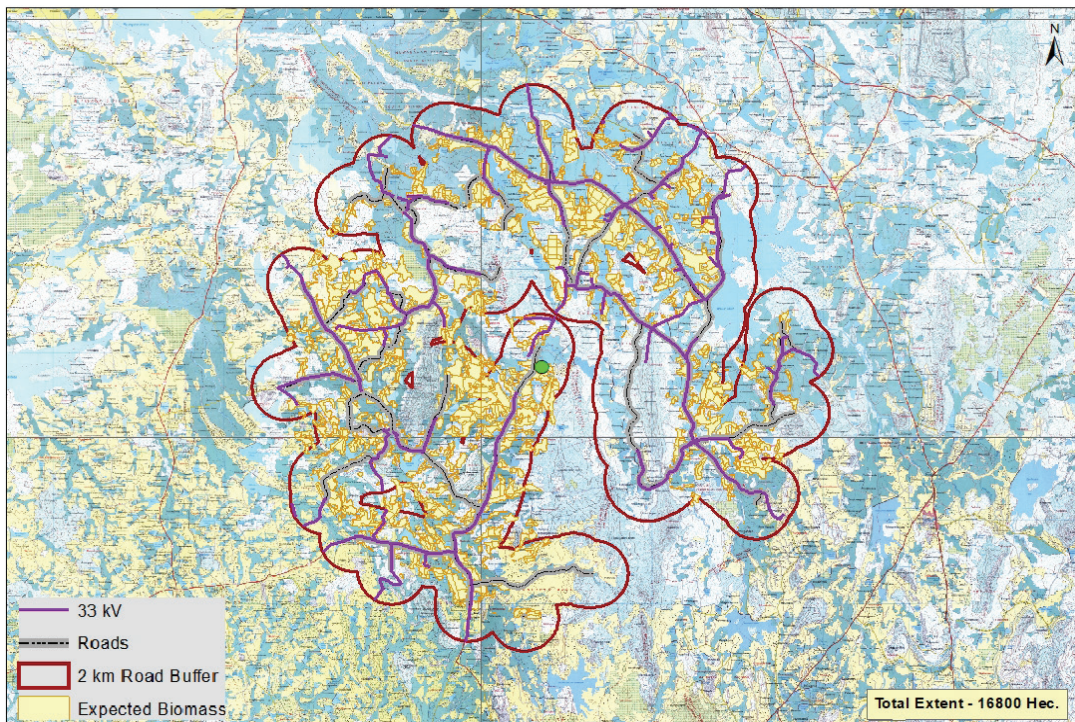
Site details of 1MW biomass power plant at
Thalawa,

Name of the GN Division - Thalawa
Divisional secretariat - Thalawa
District - Anuradhapura
Nearest town - Anuradhapura

Coordinates of the sites -
7.942143, 80.441309
Land area: 1.67 Ha
Distance to nearest town: 12.0km

Site description: Site is located by the side of Bulnewa-Ottapahuwa-Madagalla road and close to Siyambalangamuwa railway station. This is flat land and accessibility for water is available from the water tank close by. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 16800 Ha
Biomass availability: 90 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.7MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Anuradhapura

Water availability: taken from the water tank nearby.

No. 38

Cumulative Capacity
- 33.0MW

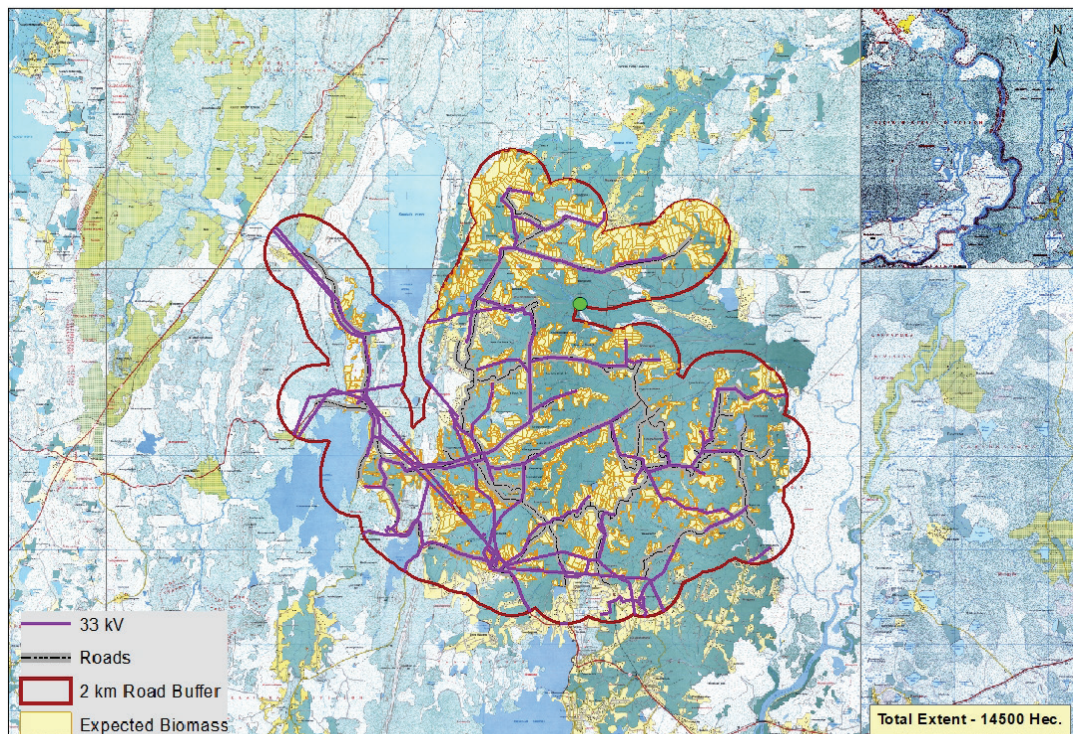
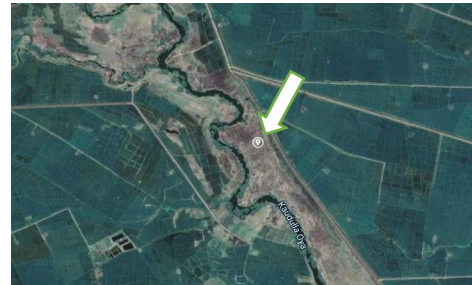
**Site details of 1MW biomass power plant at
Perakumpura, Medirigiriya**

Name of the GN Division - Perakumpura
Divisional secretariat - Medirigiriya
District - Polonnaruwa
Nearest town - Medirigiriya

Coordinates of the sites -
8.113634, 80.999772
Land area: 2.32 Ha
Distance to nearest town: 5.65km

Site description: Site is located 5.65km away from Medirigiriya town towards Diyasenapura and by the side of Kaudulla-Oya. This land is adjoining to a paddy field and there is no any residence close by. The distance to the 33kVA primary distribution line from the site is 2km. Water requirement can be meet from the Kaudulla-Oya.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 14500 Ha
Biomass availability: 78 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.5MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Polonnaruwa

Water availability: taken from Kaudulla-Oya nearby.

62

No. 39

Cumulative Capacity
- 34.0MW

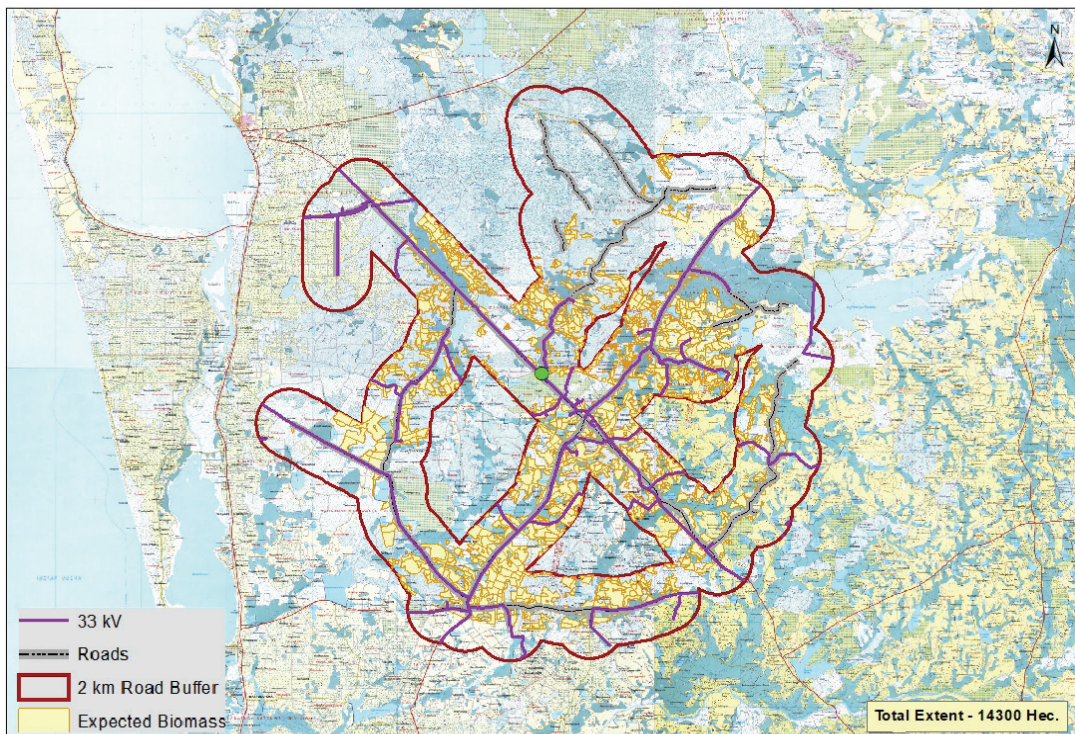
Site details of 1MW biomass power plant at Kottukachchiya, Anamaduwa

Name of the GN Division - Kottukachchiya
Divisional secretariat - Anamaduwa
District - Puttalam
Nearest town - Anamaduwa

Coordinates of the sites -
7.900803, 79.986431
Land area: 3.92Ha
Distance to nearest town: 3.75km

Site description: Site is located by the side of Katugasthota-Kurunegala-Puttalam highway. This is a Government owned flat land and accessibility for water is available from the water tank available close by. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.

Land Ownership: Government Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 14300 Ha
Biomass availability: 77 tons/day
Equivalent plant capacity for steam turbine based power plant: 1.5MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Puttalam

Water availability: taken from the water tank nearby.

No. 40

Cumulative Capacity
- 35.0MW

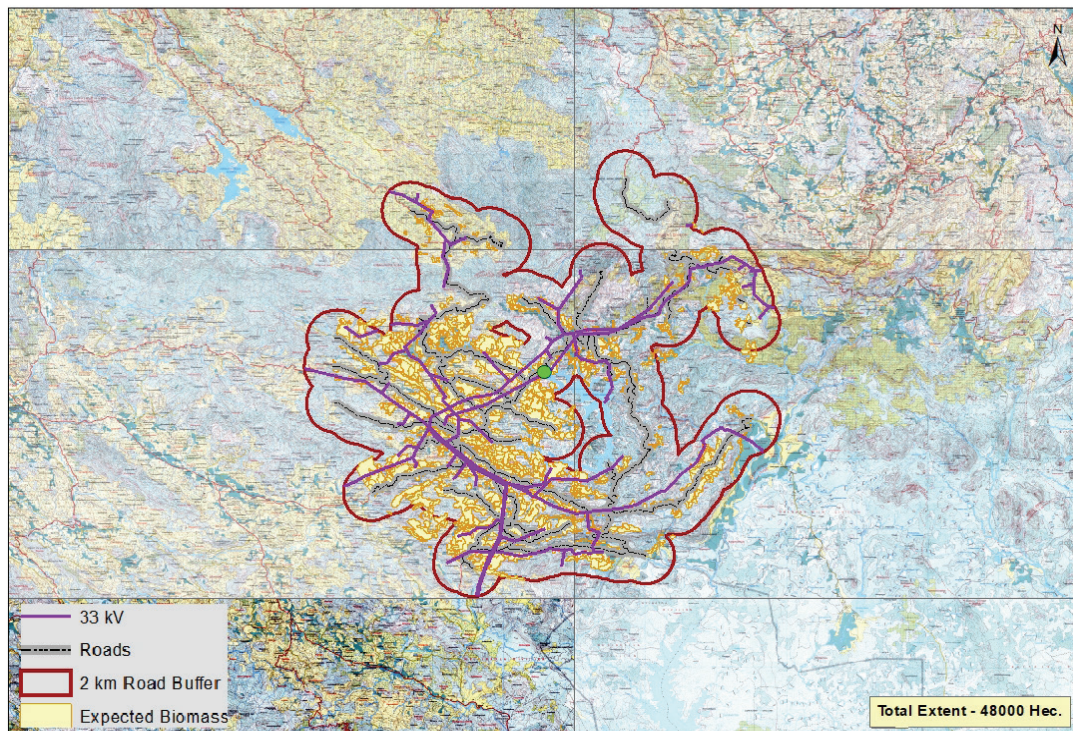
Site details of 1MW biomass power plant at
Imbulpe, Balangoda

Name of the GN Division - Imbulpe
Divisional secretariat - Imbulpe
District - Ratnapura
Nearest town - Balangoda

Coordinates of the sites -
6°41'42.9"N 80°45'10.1"E
Land area: 1.2 Ha
Distance to nearest town: 8.8km

Site description: The site is located in Imbulpe, by the side of the Badulla-Colombo main road and close to Samanalawewa reservoir. This is not a flat land and need proper assessment of the land before finalizing the plant layout. The 33kVA primary distribution line is running through this site and the grid interconnection is not an issue.

Land Ownership: Private Land



Type of biomass: SLS 1551 certified biomass
Biomass resource area: 48000 Ha
Biomass availability: 258 tons/day
Equivalent plant capacity for steam turbine based power plant: 4.8MW

Distance between 33kVA primary distribution line and the site: 100m
Substation: Balangoda

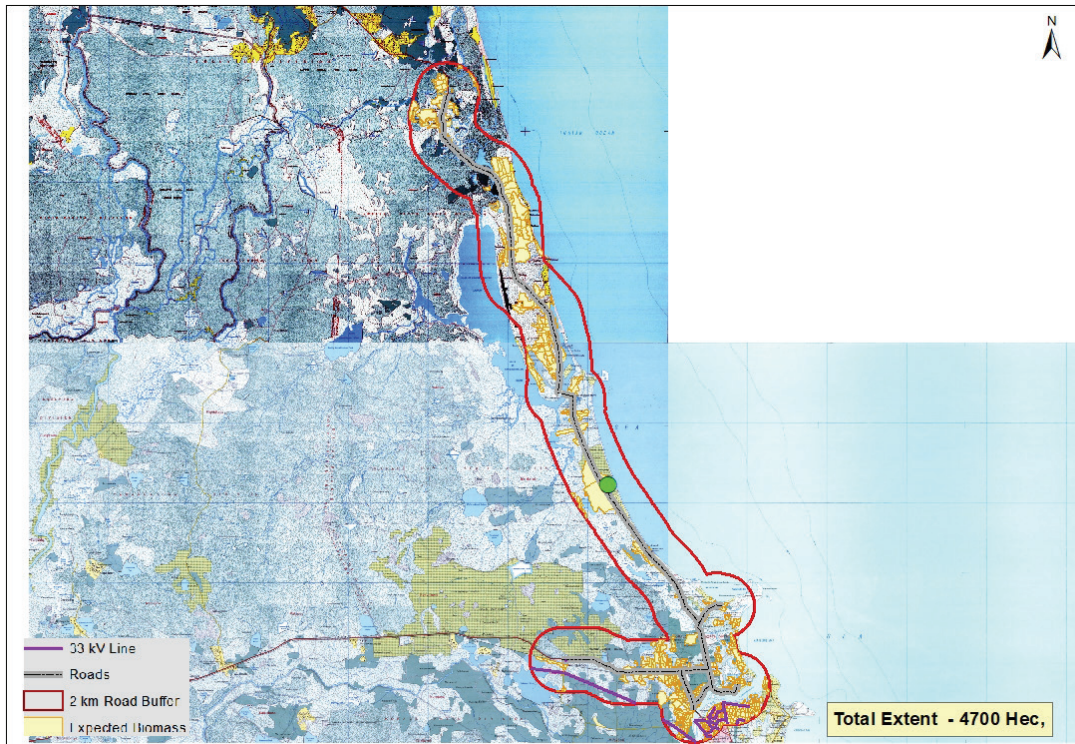
Water availability: taken from Samanalawewa tank nearby.

64

2.2. Analysis results of the rejected sites

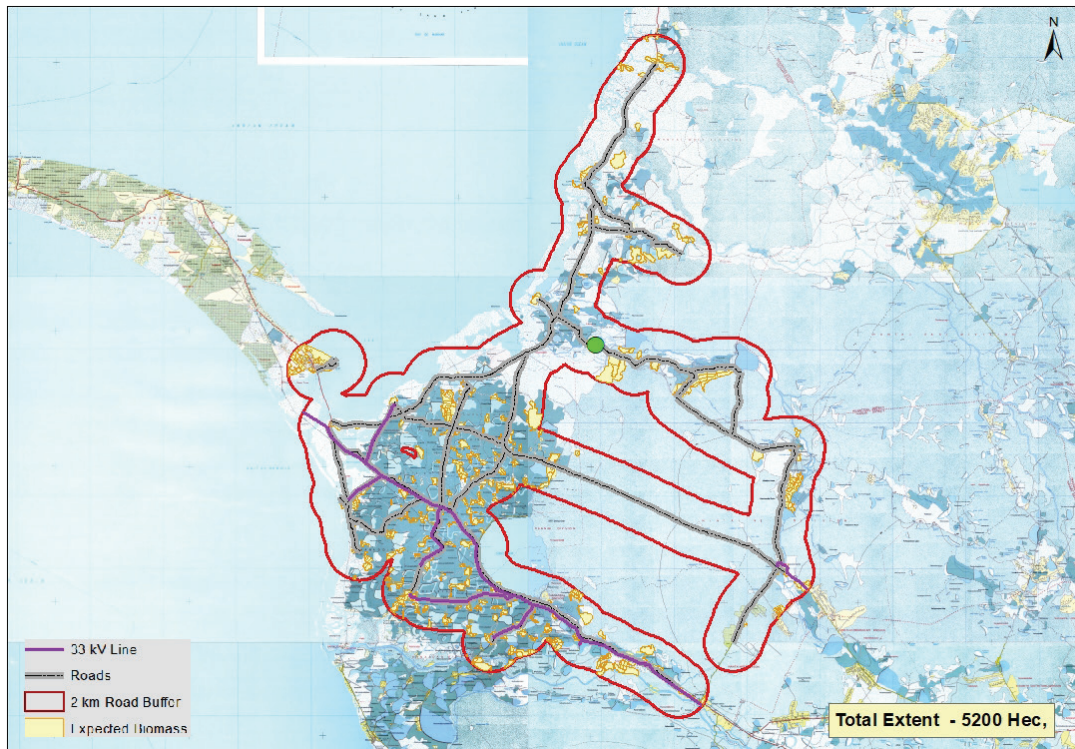
Divisional secretariat - Koralai Pattu North (Vaharai)
District - Batticaloa

Biomass resource area: 4700 Ha
Biomass availability: 25 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.48MW



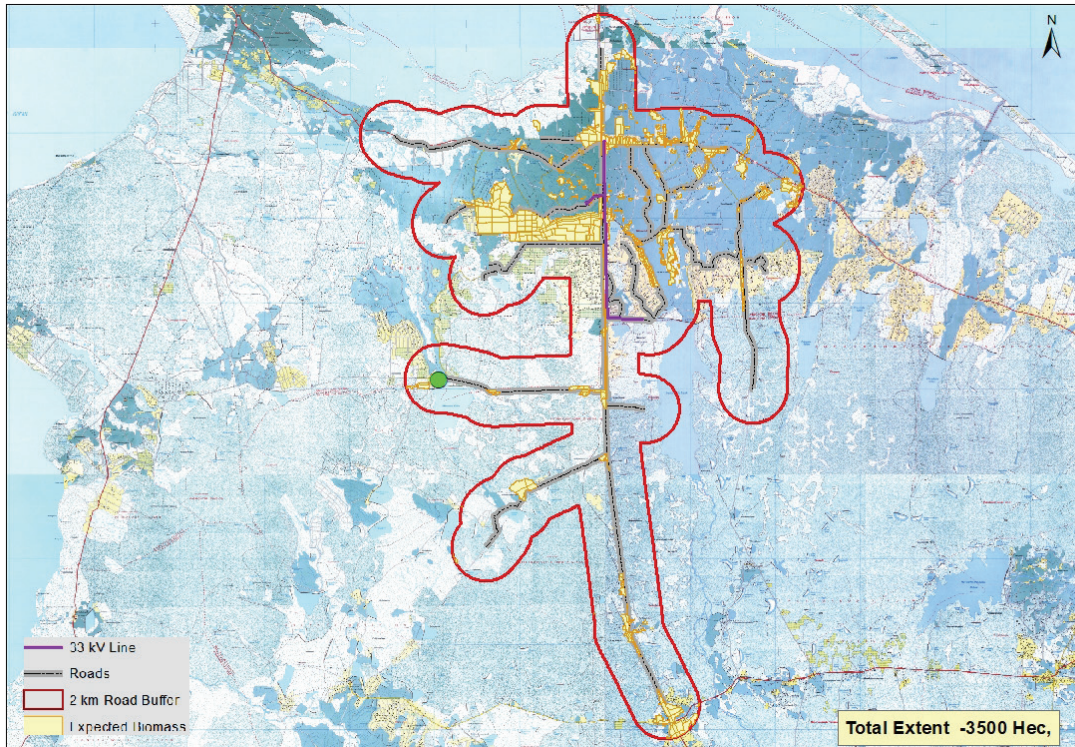
Divisional secretariat - Manthai West
District - Mannar

Biomass resource area: 5200 Ha
Biomass availability: 28 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.52MW



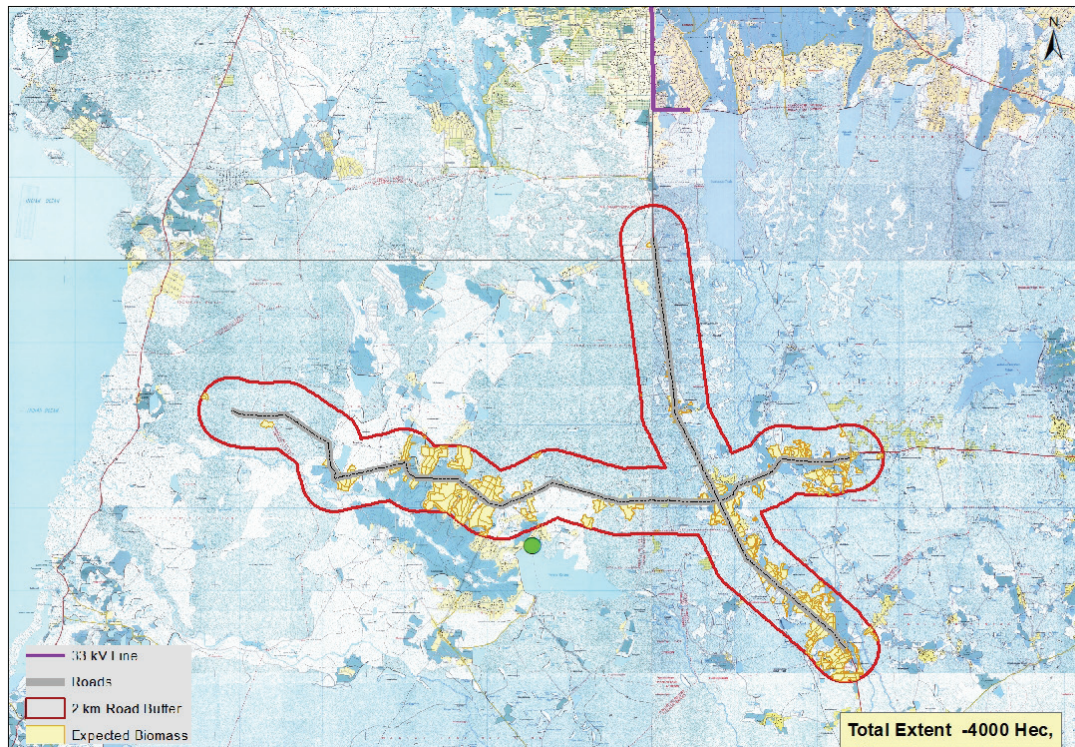
Divisional secretariat - Karachchi
District - Kilinochchi

Biomass resource area: 3500 Ha
Biomass availability: 18 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.36MW



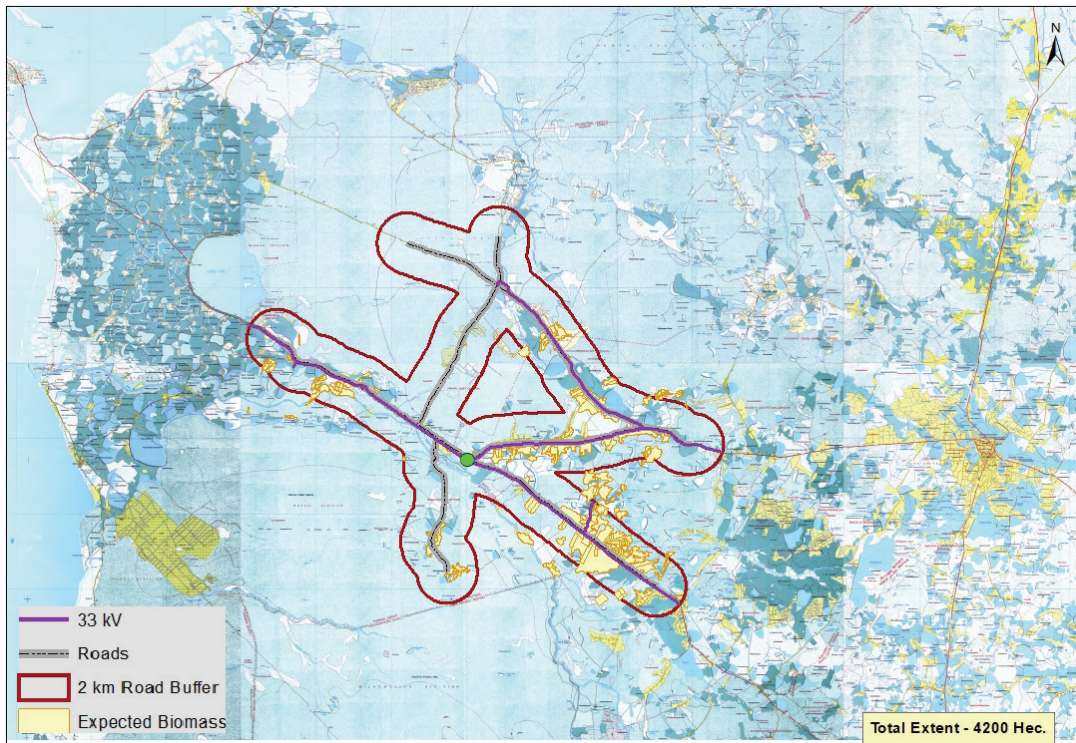
Divisional secretariat - Manthai East
District - Mullativu

Biomass resource area: 4000 Ha
Biomass availability: 22 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.40MW



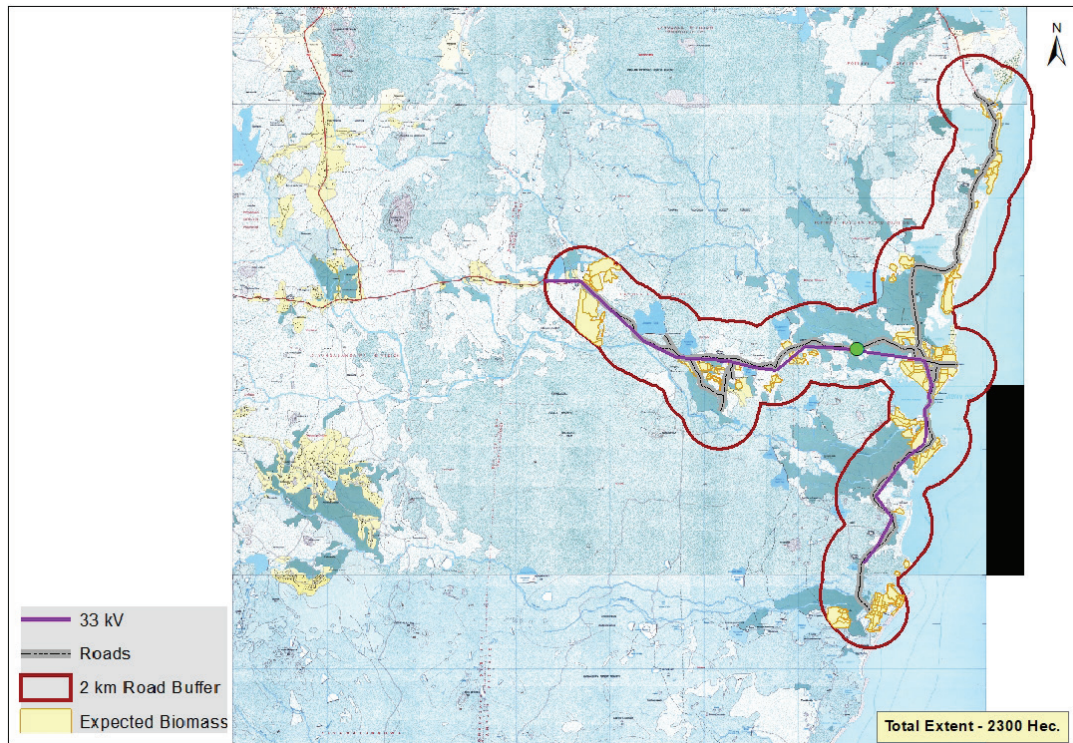
Divisional secretariat - Madhu
District - Mannar

Biomass resource area: 4200 Ha
Biomass availability: 22 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.43MW



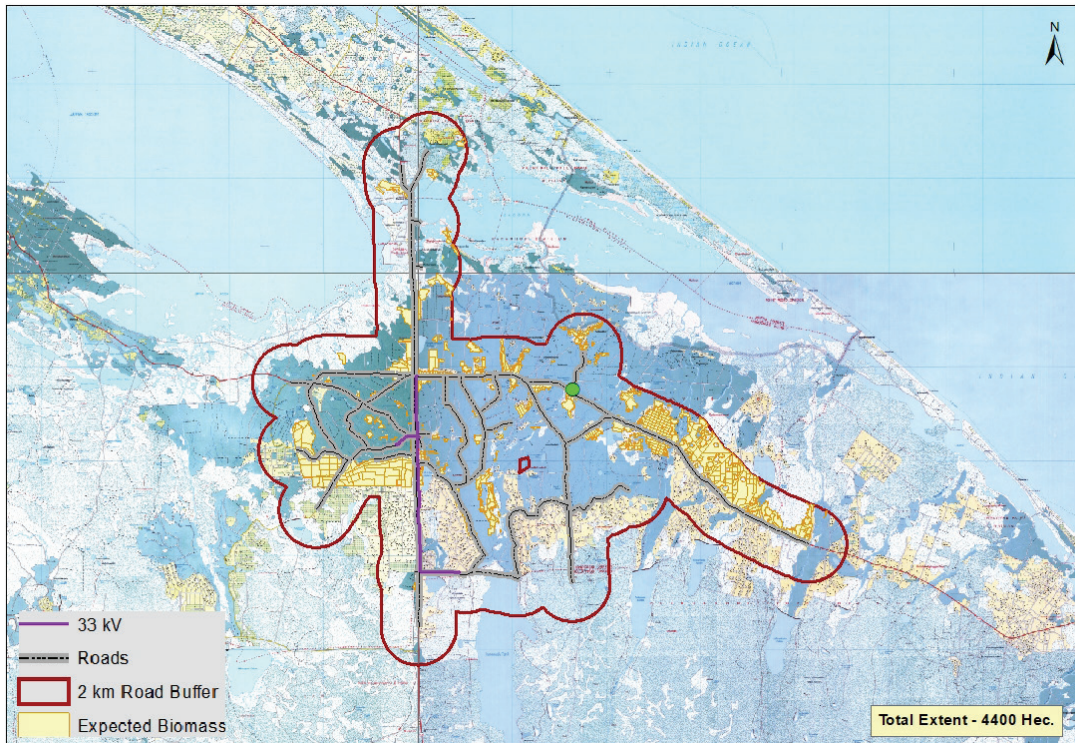
Divisional secretariat - Pothuvil
District - Ampara

Biomass resource area: 2300 Ha
Biomass availability: 12 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.23MW



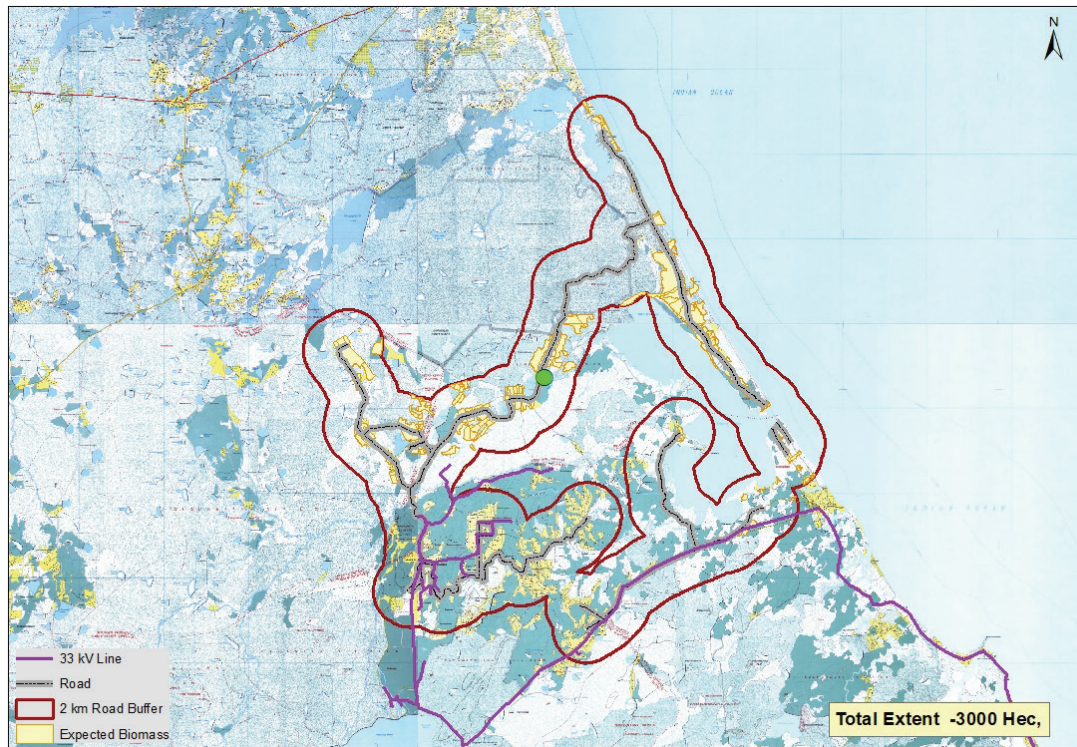
Divisional secretariat - Kandavalai
District - Kilinochchi

Biomass resource area: 4400 Ha
Biomass availability: 24 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.45MW



Divisional secretariat - Welioya
District - Mullathivu

Biomass resource area: 3000 Ha
Biomass availability: 16 tons/day
Equivalent plant capacity for steam turbine based power plant: 0.30MW



Annex I – Total marks received by each DS division based on the analysis done in section 1.1.1

Nos	District	Divisional Secretary	Biomass Potential - MW	Poverty		Weightage			Total Marks
				Head count index -%	No. of poor people	Biomass potential	Head count index	No. of poor people	
1	Batticaloa	Eraur Pattu	13.97	24.69	18242	5	3	5	13
2	Batticaloa	Manmunai West	8.28	45.14	12776	3	5	5	13
3	Monaragala	Siyambalanduwa	17.63	28.7	15041	5	3	5	13
4	Monaragala	Bibile	13.41	20.67	8085	5	3	3	11
5	Monaragala	Madulla	20.02	25.95	7830	5	3	3	11
6	Monaragala	Medagama	17.30	23.66	8245	5	3	3	11
7	Monaragala	Wellawaya	17.52	18.07	10584	5	2	4	11
8	Batticaloa	Koralai Pattu North (Vaharai)	20.60	27.99	5950	5	3	2	10
9	Batticaloa	Koralai Pattu South (Kiran)	5.86	37.68	9811	2	4	4	10
10	Mannar	Manthai West	17.50	26.9	3893	5	3	2	10
11	Mullativu	Maritimepattu	9.02	28.61	8096	4	3	3	10
12	Ratnapura	Embilipitiya	8.63	10.02	13290	3	2	5	10
13	Monaragala	Thanamalvila	15.80	21.33	5561	5	3	2	10
14	Ampara	Mahaoya	14.58	15.94	3146	5	2	2	9
15	Nuwara Eliya	Ambagamuwa	8.05	6.80	13890	3	1	5	9
16	Polonnaruwa	Welikanda	13.30	10.59	3432	5	2	2	9
17	Kurunegala	Pannala	14.56	6.78	8257	5	1	3	9
18	Kilinochchi	karachchi	2.95	20.36	12291	1	3	5	9
19	Mannar	Mannar Tow	7.44	19.88	9801	3	2	4	9
20	Mullativu	Oddusudan	6.74	33.49	4972	3	4	2	9
21	Mullativu	Puthukudiyirippu	3.81	35.66	8466	2	4	3	9
22	Mullativu	Thunukkai	7.07	34.03	3244	3	4	2	9
23	Ratnapura	Balangoda	9.13	10.33	7481	4	2	3	9
24	Badulla	Haldummulla	17.00	11.61	4276	5	2	2	9
25	Badulla	Rideemaliyadda	11.74	14.73	7361	4	2	3	9
26	Monaragala	Badalkumbura	11.80	19.13	7497	4	2	3	9
27	Monaragala	Monaragala	7.55	19.56	9297	3	2	4	9
28	Batticaloa	Manmunai South-West	3.54	28.93	7090	2	3	3	8
29	Batticaloa	Porativu Pattu	1.55	25.84	9323	1	3	4	8
30	Nuwara Eliya	Hanguranketha	4.46	11.90	10252	2	2	4	8
31	Nuwara Eliya	Nuwara Eliya	5.17	6.13	12843	2	1	5	8
32	Nuwara Eliya	Walapane	5.52	10.92	11162	2	2	4	8
33	Anuradhapura	Horowpothana	9.70	10.01	3536	4	2	2	8
34	Anuradhapura	Kahatagasdigiliya	15.44	8.97	3457	5	1	2	8
35	Anuradhapura	Medawachchiya	16.59	8.08	3599	5	1	2	8
36	Polonnaruwa	Dimbulagala	12.51	7.26	5600	5	1	2	8

37	Jaffna	Thenmaradchi (Chavakachcheri)	6.06	11.51	7391	3	2	3	8
38	Kilinochchi	Poonakary	7.81	22.73	4543	3	3	2	8
39	Mullativu	Manthai East	8.13	33.68	2336	3	4	1	8
40	Vavuniya	Vavuniya	10.80	5.41	6139	4	1	3	8
41	Ratnapura	Ratnapura	3.58	10.14	11985	2	2	4	8
42	Hambanthota	Tissamaharamaya	12.00	5.03	3347	5	1	2	8
43	Badulla	Mahiyanganaya	8.64	10.56	7765	3	2	3	8
44	Gampaha	Divulapitiya	9.86	6.09	8649	4	1	3	8
45	Ampara	Padiyathlawa	9.62	11.93	2082	4	2	1	7
46	Trinco	Kinniya	2.73	15.89	10172	1	2	4	7
47	Nuwara Eliya	Kothamale	3.19	9.85	9813	2	1	4	7
48	Anuradhapura	Kekirawa	11.56	5.98	3433	4	1	2	7
49	Anuradhapura	Nochchiyagama	10.17	6.45	3089	4	1	2	7
50	Anuradhapura	Nuwaragam Palatha (C)	10.43	6.19	3595	4	1	2	7
51	Anuradhapura	Rambewa	11.23	8.56	3017	4	1	2	7
52	Anuradhapura	Thirappane	13.15	8.11	2105	5	1	1	7
53	Kurunegala	Bingiriya	10.08	8.68	5317	4	1	2	7
54	Kurunegala	Ibbagamuwa	7.66	7.25	6038	3	1	3	7
55	Kurunegala	Polpithigama	7.47	9.04	6638	3	1	3	7
56	Kurunegala	Rideegama	9.37	6.87	5944	4	1	2	7
57	Puttalam	Kalpitiya	7.67	8.28	6968	3	1	3	7
58	Puttalam	Mundel	11.57	8.34	5043	4	1	2	7
59	Jaffna	Valikamam East (Kopai)	1.65	13.18	9528	1	2	4	7
60	Kilinochchi	Pachchilaipalli	9.24	18.64	1541	4	2	1	7
61	Mannar	Madhu	8.99	22	1631	3	3	1	7
62	Vavuniya	Vengalcheddikulam	14.84	9.45	2717	5	1	1	7
63	Ratnapura	Godakawela	2.76	12.12	9128	1	2	4	7
64	Ratnapura	Kalawana	4.77	12.71	6432	2	2	3	7
65	Ratnapura	Kuruvita	1.20	12.42	11642	1	2	4	7
66	Ratnapura	Pelmadulla	1.99	12.16	10776	1	2	4	7
67	Ratnapura	Weligepola	6.21	11.22	3421	3	2	2	7
68	Hambanthota	Lunugamwehera	13.28	6.82	2086	5	1	1	7
69	Matara	Pasgoda	3.10	11.43	6680	2	2	3	7
70	Monaragala	Buttala	3.88	18.55	9597	2	2	3	7
71	Monaragala	Katharagama	6.03	18.55	3219	3	2	2	7
72	Monaragala	Sevanagala	3.71	18.34	7573	2	2	3	7
73	Gampaha	Mirigama	5.91	6	9591	2	1	4	7
74	Ampara	Pothuvil	5.13	12.68	4379	2	2	2	6
75	Ampara	Sammanthurai	0.77	12.49	7462	1	2	3	6
76	Ampara	Uhana	7.24	6.29	3546	3	1	2	6
77	Batticaloa	Manmunai South and Eruvil Pattu	0.53	13.94	8429	1	2	3	6

78	Trinco	Kuchchaveli	10.27	8.88	2900	4	1	1	6
79	Trinco	Muttur	6.22	9.42	5279	3	1	2	6
80	Anuradhapura	Palugaswewa	11.53	8.08	1203	4	1	1	6
81	Kurunegala	Galgamuwa	6.56	8.37	4421	3	1	2	6
82	Kurunegala	Kuliyapitiya West	7.29	5.89	4440	3	1	2	6
83	Kurunegala	Maho	8.35	7.43	4103	3	1	2	6
84	Kurunegala	Udubaddawa	7.74	7.51	3856	3	1	2	6
85	Kurunegala	Wariyapola	7.54	6.53	3867	3	1	2	6
86	Jaffna	Valikamam South (Uduvil)	0.20	11.85	6203	1	2	3	6
87	Jaffna	Valikamam South-West (Sandilipai)	0.57	12.44	6436	1	2	3	6
88	Jaffna	Valikamam West (Chankanai)	0.79	14.63	6751	1	2	3	6
89	Kilinochchi	Kandavalai	2.91	21.13	4875	1	3	2	6
90	Mannar	Musalai	4.16	25.74	2064	2	3	1	6
91	Vavuniya	Vavuniya North	8.66	10.74	1176	3	2	1	6
92	Kegalla	Yatyanthota	2.07	11.12	6702	1	2	3	6
93	Ratnapura	Ayagama	5.28	11.97	3664	2	2	2	6
94	Ratnapura	Eheliyagoda	1.05	9.82	6859	1	2	3	6
95	Ratnapura	Kolonna	3.97	13.15	5953	2	2	2	6
96	Ratnapura	Nivithigala	1.67	11.96	7116	1	2	3	6
97	Galle	Karandeniya	0.79	10.06	6183	1	2	3	6
98	Hambantota	Hambantota	11.49	5.35	2991	4	1	1	6
99	Matara	Kotapola	2.29	11.7	7290	1	2	3	6
100	Matara	Welipitiya	0.94	11.92	6114	1	2	3	6
101	Badulla	Hali-Ela	4.63	8.91	7915	2	1	3	6
102	Badulla	Lunugala	5.09	14.6	4519	2	2	2	6
103	Badulla	Passara	5.12	10.67	5087	2	2	2	6
104	Badulla	Uva Paranagama	3.31	9.01	6868	2	1	3	6
105	Gampaha	Attanagalla	4.45	4.63	8085	2	1	3	6
106	Gampaha	Dompe	3.91	5.51	8321	2	1	3	6
107	Gampaha	Katana	1.96	4.07	9288	1	1	4	6
108	Gampaha	Minuwangoda	4.18	4.85	8508	2	1	3	6
109	Kalutara	Beruwala	0.65	6.7	10856	1	1	4	6
110	Ampara	Addalachchenai	1.12	10.71	4315	1	2	2	5
111	Ampara	Damana	7.09	7.55	2826	3	1	1	5
112	Ampara	Dehiaththakandiya	3.14	7.16	4174	2	1	2	5
113	Batticaloa	Koralai Pattu(Valachchenai)	1.41	18.42	4244	1	2	2	5
114	Batticaloa	Mnmunai North	0.68	8.06	6705	1	1	3	5
115	Batticaloa	Mnmunai Pattu (Araipattai)	0.73	13.98	4244	1	2	2	5
116	Matale	Dambulla	5.09	7.11	4890	2	1	2	5
117	Matale	Galevela	5.09	7.76	5304	2	1	2	5
118	Matale	Wilgamuwa	3.99	10.38	2978	2	2	1	5

119	Anuradhapura	Galenbindunuwewa	7.35	6.66	2997	3	1	1	5
120	Anuradhapura	Mahavilachchiya	7.85	9.79	2109	3	1	1	5
121	Anuradhapura	Mihinthale	8.05	5.68	1810	3	1	1	5
122	Anuradhapura	Thalawa	4.75	6.35	3546	2	1	2	5
123	Polonnaruwa	Medirigiriya	5.74	6.05	3839	2	1	2	5
124	Kurunegala	Alawwa	4.46	6.83	4246	2	1	2	5
125	Kurunegala	Ganewatta	6.06	7.36	2866	3	1	1	5
126	Kurunegala	Kotavehera	7.40	8.76	1789	3	1	1	5
127	Kurunegala	Kuliyapitiya East	5.32	8.22	4254	2	1	2	5
128	Kurunegala	Kurunegala	3.58	4.33	3390	2	1	2	5
129	Kurunegala	Mawathagama	3.26	6.05	3826	2	1	2	5
130	Kurunegala	Narammala	4.71	6.33	3486	2	1	2	5
131	Kurunegala	Panduwasnuwara	4.02	7.64	4776	2	1	2	5
132	Kurunegala	Panduwasnuwara East	6.91			3	1	1	5
133	Kurunegala	Rasnayakapura	5.54	10.00	2131	2	2	1	5
134	Puttalam	Anamaduwa	8.61	5.70	2116	3	1	1	5
135	Puttalam	Chilaw	3.32	5.20	3218	2	1	2	5
136	Puttalam	Dankotuwa	3.34	5.42	3331	2	1	2	5
137	Puttalam	Karuwalagaswewa	7.06	5.69	1295	3	1	1	5
138	Puttalam	Nattandiya	3.21	5.23	3193	2	1	2	5
139	Puttalam	Puttalam	5.42	5.78	4669	2	1	2	5
140	Puttalam	Vanathavilluwa	8.06	8.85	1514	3	1	1	5
141	Jaffna	Vadamarachchi East	4.44	16.37	2077	2	2	1	5
142	Jaffna	Vadamarachchi South-West (Karaveddy)	0.65	12.35	5635	1	2	2	5
143	Jaffna	Valikamam North	2.47	13.45	3895	1	2	2	5
144	Mullativu	Welioya	4.45	18.25	1249	2	2	1	5
145	Kegalla	Dehiowita	1.08	9.76	7814	1	1	3	5
146	Kegalla	Deraniyagala	2.53	11.85	5341	1	2	2	5
147	Kegalla	Mawanella	1.00	6.25	6810	1	1	3	5
148	Kegalla	Warakapola	2.06	7.32	8096	1	1	3	5
149	Ratnapura	Elapatha	1.58	12.25	4603	1	2	2	5
150	Ratnapura	Imbulpe	4.34	9.36	5330	2	1	2	5
151	Ratnapura	Kahawatta	1.00	13.18	5659	1	2	2	5
152	Ratnapura	Opanayaka	0.81	11.5	3027	1	2	2	5
153	Galle	Akmeemana	0.98	8.83	6727	1	1	3	5
154	Galle	Baddegama	1.56	8.99	6590	1	1	3	5
155	Galle	Hikkaduwa	1.00	7.9	7798	1	1	3	5
156	Galle	Imaduwa	1.11	10.31	4550	1	2	2	5
157	Galle	Neluwa	1.80	11.3	3168	1	2	2	5
158	Galle	Thawalama	2.48	11.87	3801	1	2	2	5
159	Galle	Yakkalamulla	1.78	11.37	5148	1	2	2	5
160	Hambanthota	Katuwana	3.22	7.2	3296	2	1	2	5

161	Hambanthota	Sooriyawewa	4.10	8.13	3429	2	1	2	5
162	Matara	Akuressa	1.94	10.72	5579	1	2	2	5
163	Matara	Athuraliya	0.83	11.41	3589	1	2	2	5
164	Matara	Hakmana	0.84	10.63	3290	1	2	2	5
165	Matara	Mulatiyana	1.58	10.29	5088	1	2	2	5
166	Matara	Pitabeddara	2.39	11.38	5741	1	2	2	5
167	Badulla	Kandaketiya	4.29	13.19	2955	2	2	1	5
168	Badulla	Meegahakivula	5.20	14.77	2826	2	2	1	5
169	Badulla	Soranathota	3.54	10.81	2355	2	2	1	5
170	Badulla	Welimada	2.01	7.72	7598	1	1	3	5
171	Gampaha	Biyagama	0.51	3.33	6068	1	1	3	5
172	Gampaha	Ja-Ela	0.34	3.08	6072	1	1	3	5
173	Gampaha	Mahara	2.19	3.7	7507	1	1	3	5
174	Kalutara	Kalutara	0.50	4.2	6499	1	1	3	5
175	Kalutara	Palindanuwara	3.36	8.4	4207	2	1	2	5
176	Kalutara	Walallavita	3.03	6.42	3430	2	1	2	5
177	Ampara	Irakkamam	0.94	12.18	1749	1	2	1	4
178	Ampara	Navithanveli	0.27	12.81	2389	1	2	1	4
179	Ampara	Thirukkivil	1.59	10.56	2659	1	2	1	4
180	Batticaloa	Koralai Pattu Central	0.11	10.99	2761	1	2	1	4
181	Trinco	Trincomalee Town & Gravets	2.92	4.72	4489	1	1	2	4
182	Trinco	Verugal (Echchilampattu)	2.00	14.34	1627	1	2	1	4
183	Matale	Ambanganga Korale	1.87	10.67	1643	1	2	1	4
184	Matale	Laggala-Pallegama	3.79	9.59	1128	2	1	1	4
185	Matale	Matale	1.47	5.71	4176	1	1	2	4
186	Matale	Naula	4.96	7.67	2298	2	1	1	4
187	Matale	Pallepola	3.63	6.83	1943	2	1	1	4
188	Matale	Rattota	1.79	8.46	4261	1	1	2	4
189	Matale	Ukuwela	1.27	8.62	5740	1	1	2	4
190	Anuradhapura	Ipalogama	4.26	5.54	2072	2	1	1	4
191	Anuradhapura	Kebithigollewa	2.80	10.20	2167	1	2	1	4
192	Anuradhapura	Thambuththegama	1.28	7.38	3042	1	1	2	4
193	Polonnaruwa	Hingurakgoda	5.14	4.26	2624	2	1	1	4
194	Kurunegala	Ambanpola	5.68	8.00	1764	2	1	1	4
195	Kurunegala	Bamunakotuwa	4.74	6.39	2266	2	1	1	4
196	Kurunegala	Ehetuwewa	4.81	8.08	2008	2	1	1	4
197	Kurunegala	Giribawa	3.33	8.75	2661	2	1	1	4
198	Kurunegala	Kobeigane	4.45	7.78	2745	2	1	1	4
199	Kurunegala	Mallawapitiya	3.03	5.66	2933	2	1	1	4
200	Kurunegala	Nikaweratiya	4.18	7.40	2890	2	1	1	4
201	Kurunegala	Polgahawela	2.76	5.87	3733	1	1	2	4
202	Kurunegala	Weerambagedara	4.14	5.76	1934	2	1	1	4

203	Puttalam	Arachchikattuwa	5.32	6.22	2522	2	1	1	4
204	Puttalam	Madampe	5.21	5.76	2712	2	1	1	4
205	Puttalam	Mahakumbukkadawala	5.17	6.23	1138	2	1	1	4
206	Puttalam	Mahawewa	3.33	5.58	2808	2	1	1	4
207	Puttalam	Pallama	5.19	6.94	1675	2	1	1	4
208	Puttalam	Wennappuwa	0.85	5.25	3515	1	1	2	4
209	Jaffna	Delft	1.28	13.47	508	1	2	1	4
210	Jaffna	Island North (Kayts)	0.74	15.25	1476	1	2	1	4
211	Jaffna	Island South (Velanai)	1.48	16.75	2803	1	2	1	4
212	Jaffna	Karainagar	0.41	14.42	1379	1	2	1	4
213	Jaffna	Nallur	0.72	7.33	4914	1	1	2	4
214	Jaffna	Vadamarachchi North (Point Pedro)	1.25	9.13	4317	1	1	2	4
215	Mannar	Nanattan	2.72	15.97	2766	1	2	1	4
216	Vavuniya	Vavuniya South	5.53	4.86	604	2	1	1	4
217	Kegalla	Aranayake	1.96	7.1	4741	1	1	2	4
218	Kegalla	Bulathkohupitiya	2.03	9.82	4548	1	1	2	4
219	Kegalla	Galigamuwa	1.33	7.44	5418	1	1	2	4
220	Kegalla	Kegalla	1.42	6.62	5837	1	1	2	4
221	Kegalla	Rambukkana	2.37	6.36	5127	1	1	2	4
222	Kegalla	Ruwanwella	1.22	8.17	5140	1	1	2	4
223	Galle	Ambalangoda	0.24	6.3	3528	1	1	2	4
224	Galle	Balapitiya	0.50	8.7	5736	1	1	2	4
225	Galle	Benthota	0.64	9.28	4519	1	1	2	4
226	Galle	Bope-Poddala	0.24	6.55	3174	1	1	2	4
227	Galle	Elpitiya	1.67	8.64	5444	1	1	2	4
228	Galle	Galle Four Gravets	0.06	5.74	5639	1	1	2	4
229	Galle	Habaraduwa	0.92	9.01	5450	1	1	2	4
230	Galle	Nagoda	2.03	9.6	5071	1	1	2	4
231	Galle	Niyagama	2.12	9.86	3422	1	1	2	4
232	Galle	Wliviya-Divithura	1.19	10.25	2941	1	2	1	4
233	Hambanthota	Ambalantota	2.26	5.31	3775	1	1	2	4
234	Hambanthota	Beliatta	3.24	4.97	2726	2	1	1	4
235	Hambanthota	Tangalla	3.97	3.71	2627	2	1	1	4
236	Hambanthota	Weeraketiya	3.79	5.82	2371	2	1	1	4
237	Matara	Devinuwara	0.47	8.03	3806	1	1	2	4
238	Matara	Dikwella	1.24	8.52	4575	1	1	2	4
239	Matara	Kamburupitiya	0.55	9.23	3667	1	1	2	4
240	Matara	Matara Four Gravets	0.54	3.8	4237	1	1	2	4
241	Matara	Thihagoda	0.30	9.22	3026	1	1	2	4
242	Matara	Weligama	0.83	8.3	5913	1	1	2	4
243	Badulla	Badulla	0.80	4.89	3507	1	1	2	4
244	Badulla	Bandarawela	1.44	5.99	3810	1	1	2	4

245	Badulla	Ella	2.62	9.94	4401	1	1	2	4
246	Badulla	Haputale	1.05	8.66	4121	1	1	2	4
247	Gampaha	Gampaha	0.89	2.86	5562	1	1	2	4
248	Gampaha	Wattala	0.55	2.68	4567	1	1	2	4
249	Kalutara	Bandaragama	0.37	3.98	4273	1	1	2	4
250	Kalutara	Bulathsinhala	2.86	6.96	4434	1	1	2	4
251	Kalutara	Dodangoda	0.94	5.88	3704	1	1	2	4
252	Kalutara	Horana	1.31	3.95	4391	1	1	2	4
253	Kalutara	Mathugama	1.64	6.41	5123	1	1	2	4
254	Kalutara	Panadura	0.23	2.88	5155	1	1	2	4
255	Ampara	Akkaraipattu	0.26	5.48	2143	1	1	1	3
256	Ampara	Alayadivembu	0.16	8.31	1857	1	1	1	3
257	Ampara	Ampara	1.00	4.67	1940	1	1	1	3
258	Ampara	Kalmunai	0.04	4.14	1827	1	1	1	3
259	Ampara	Kalmunai Division Tamil	0.01	6.99	2063	1	1	1	3
260	Ampara	Karaitheevu	0.03	4.62	770	1	1	1	3
261	Ampara	Lahugala	1.96	6.73	584	1	1	1	3
262	Ampara	Ninthavur	0.27	5.03	1321	1	1	1	3
263	Batticaloa	Eraur Town	0.00	10.99	2664	0	2	1	3
264	Batticaloa	Koralai Pattu West (Oddamavadi)	0.50	7.73	1703	1	1	1	3
265	Trinco	Gomarankadawala	0.38	6.10	424	1	1	1	3
266	Trinco	Kantale	0.85	4.69	2120	1	1	1	3
267	Trinco	Morawewa	0.08	7.47	568	1	1	1	3
268	Trinco	Padavi Sri Pura	0.03	5.11	587	1	1	1	3
269	Trinco	Seruvila	1.36	8.89	1179	1	1	1	3
270	Trinco	Thambalagamuwa	0.60	8.13	2276	1	1	1	3
271	Matale	Yatawatta	2.45	8.19	2413	1	1	1	3
272	Anuradhapura	Galnewa	2.50	6.58	2215	1	1	1	3
273	Anuradhapura	Nachchaduwa	2.26	6.10	1515	1	1	1	3
274	Anuradhapura	Nuwaragam Palatha (E)	1.91	1.96	1290	1	1	1	3
275	Anuradhapura	Padaviya	0.00	8.40	1848	1	1	1	3
276	Anuradhapura	Palagala	2.33	7.58	2504	1	1	1	3
277	Anuradhapura	Rajanganaya	1.03	5.69	1860	1	1	1	3
278	Polonnaruwa	Elahera	2.75	6.21	2645	1	1	1	3
279	Polonnaruwa	Lankapura	1.73	5.13	1836	1	1	1	3
280	Polonnaruwa	Thamankaduwa	2.56	3.69	2923	1	1	1	3
281	Kurunegala	Maspotha	1.98	4.70	1584	1	1	1	3
282	Puttalam	Nawagattegama	2.81	6.19	867	1	1	1	3
283	Jaffna	Jaffna	0.08	6.58	2334	1	1	1	3
284	Ratnapura	Kiriella	1.30	9.16	2950	1	1	1	3
285	Galle	Gonapinuwala	0.37	7.71	1638	1	1	1	3
286	Hambanthota	Angunakolapelessa	2.04	6.01	2860	1	1	1	3

287	Hambanthota	Okewela	1.07	6.69	1243	1	1	1	3
288	Hambanthota	Walasmulla	2.31	6.49	2695	1	1	1	3
289	Matara	Kirinda Puhulwella	0.55	9.17	1823	1	1	1	3
290	Matara	Malimbada	0.45	8.18	2840	1	1	1	3
291	Campaha	Kelaniya	0.02	2.16	2822	1	1	1	3
292	Campaha	Negombo	0.08	1.66	2305	1	1	1	3
293	Kalutara	Agalawatta	1.27	5.51	1974	1	1	1	3
294	Kalutara	Ingiriya	0.79	5.45	2876	1	1	1	3
295	Kalutara	Madurawala	0.67	4.41	1495	1	1	1	3
296	Kalutara	Millaniya	0.90	5.8	2981	1	1	1	3
297	Ampara	Sainthamaruthu	0.00	3.16	800	0	1	1	2
298	Batticaloa	Kattankudy	0.00	5.26	2101	0	1	1	2
299	Kurunegala	Katupotha		7.09	2251		1	1	2

