Environmental Impact Assessment

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MLD: Greater Malé Waste-to-Energy Project – Waste to Energy Plant (PART F)

Prepared by Ministry of Environment of the Republic of Maldives for the Asian Development Bank.

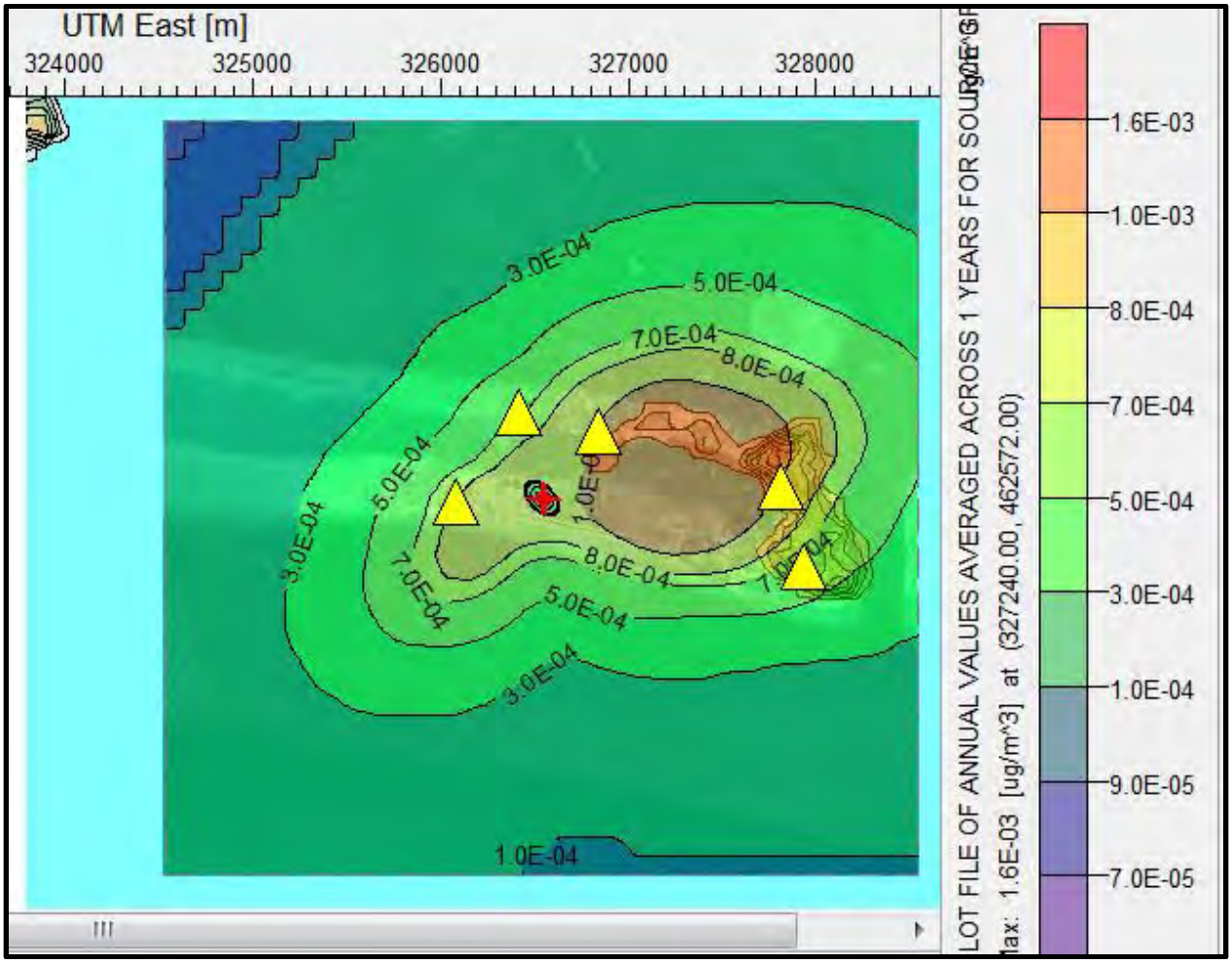

Figure 40: Hg 1 year (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

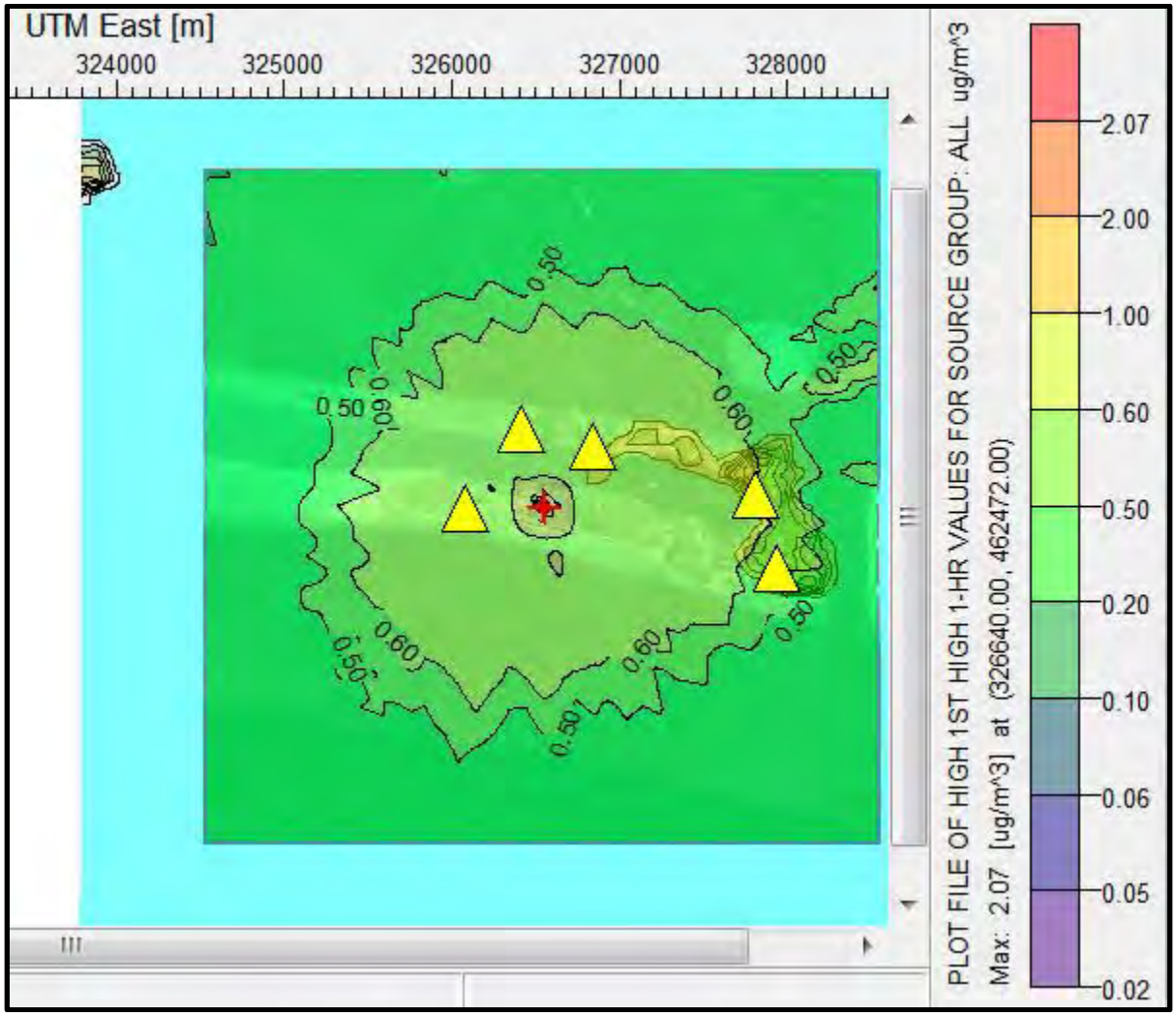

Figure 41: NH_3 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

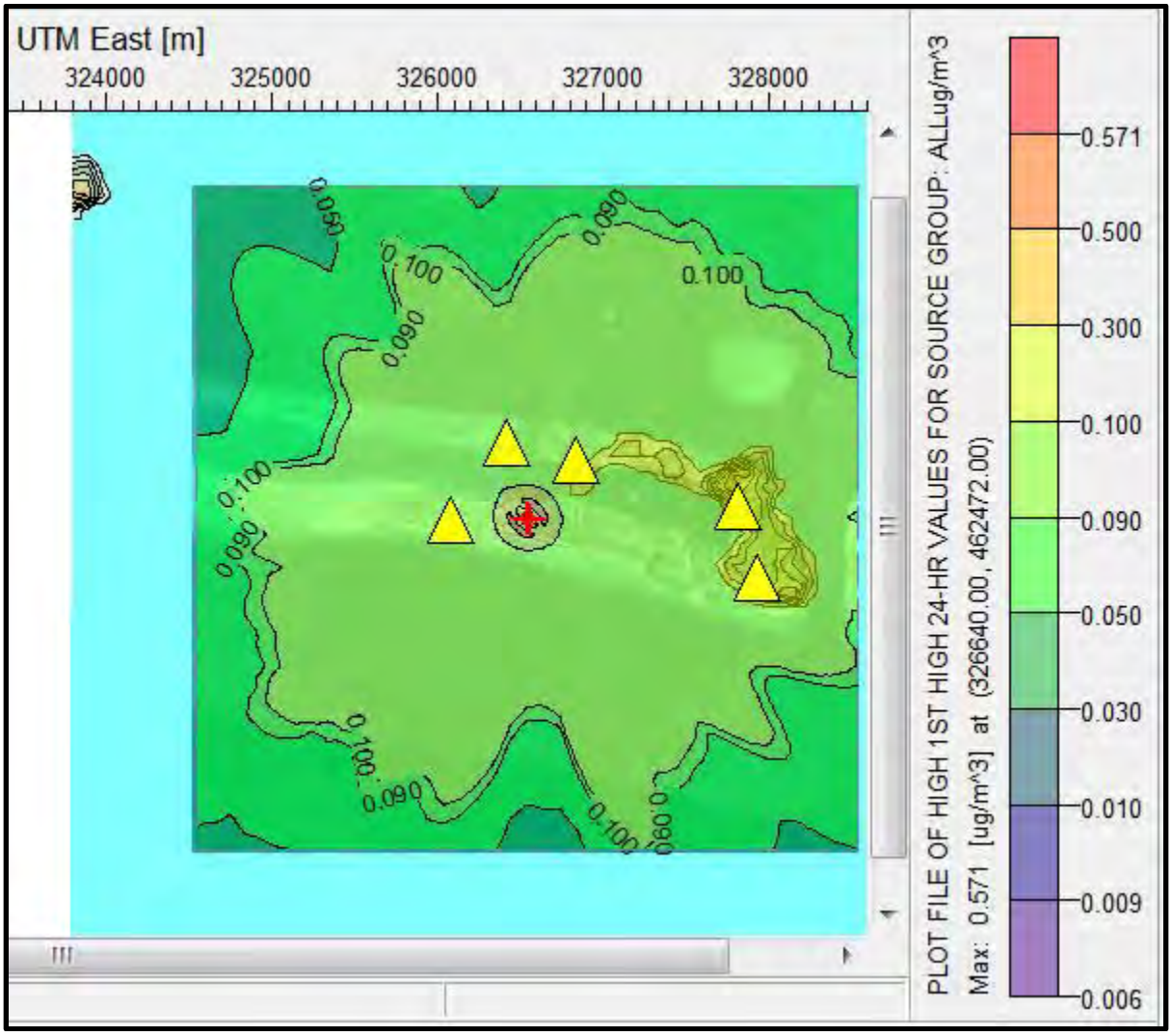

Figure 42: 5.19 NH_3 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

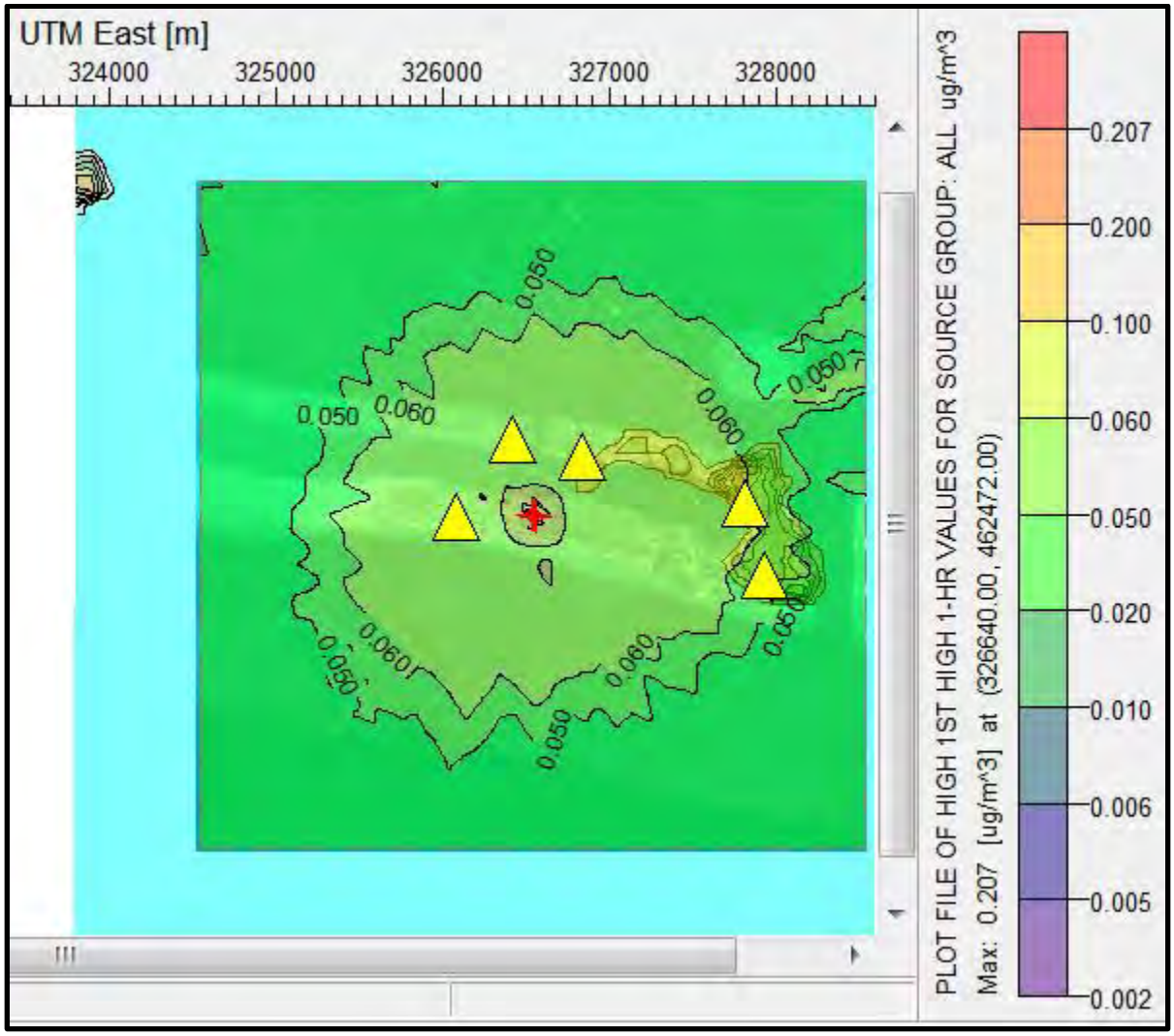

Figure 43: HF 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

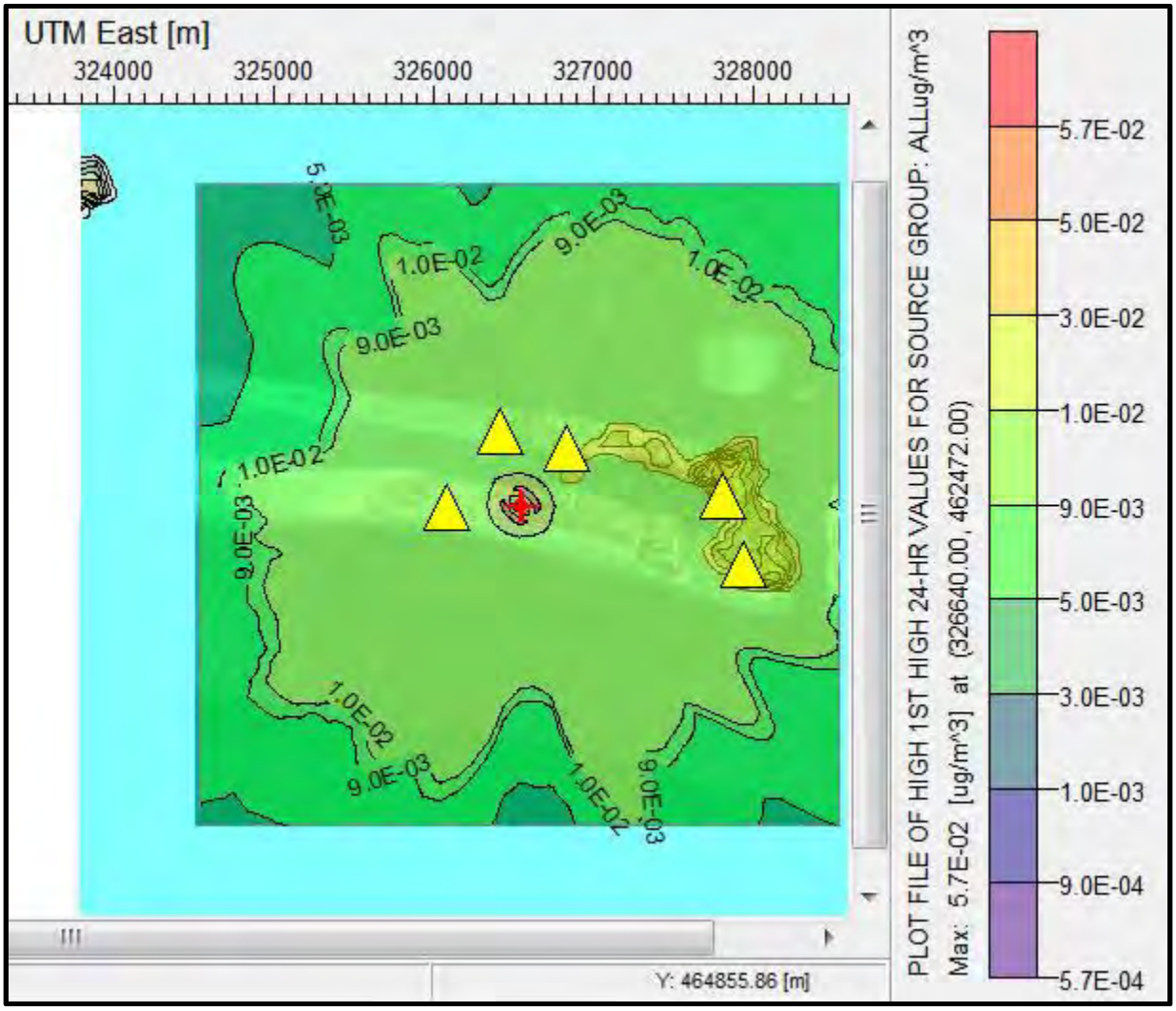

Figure 44: HF 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

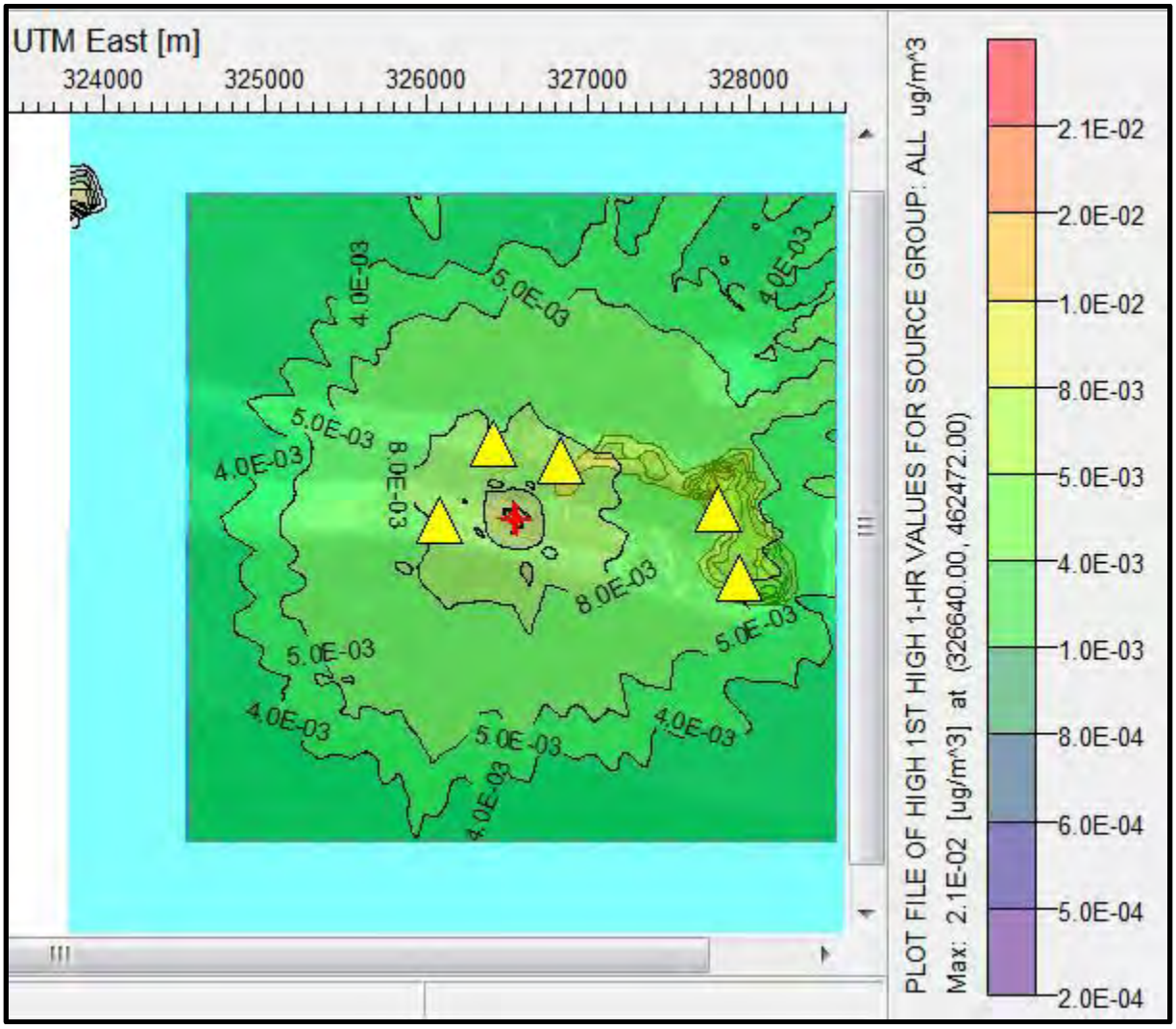

Figure 45: Dioxin and Furans 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

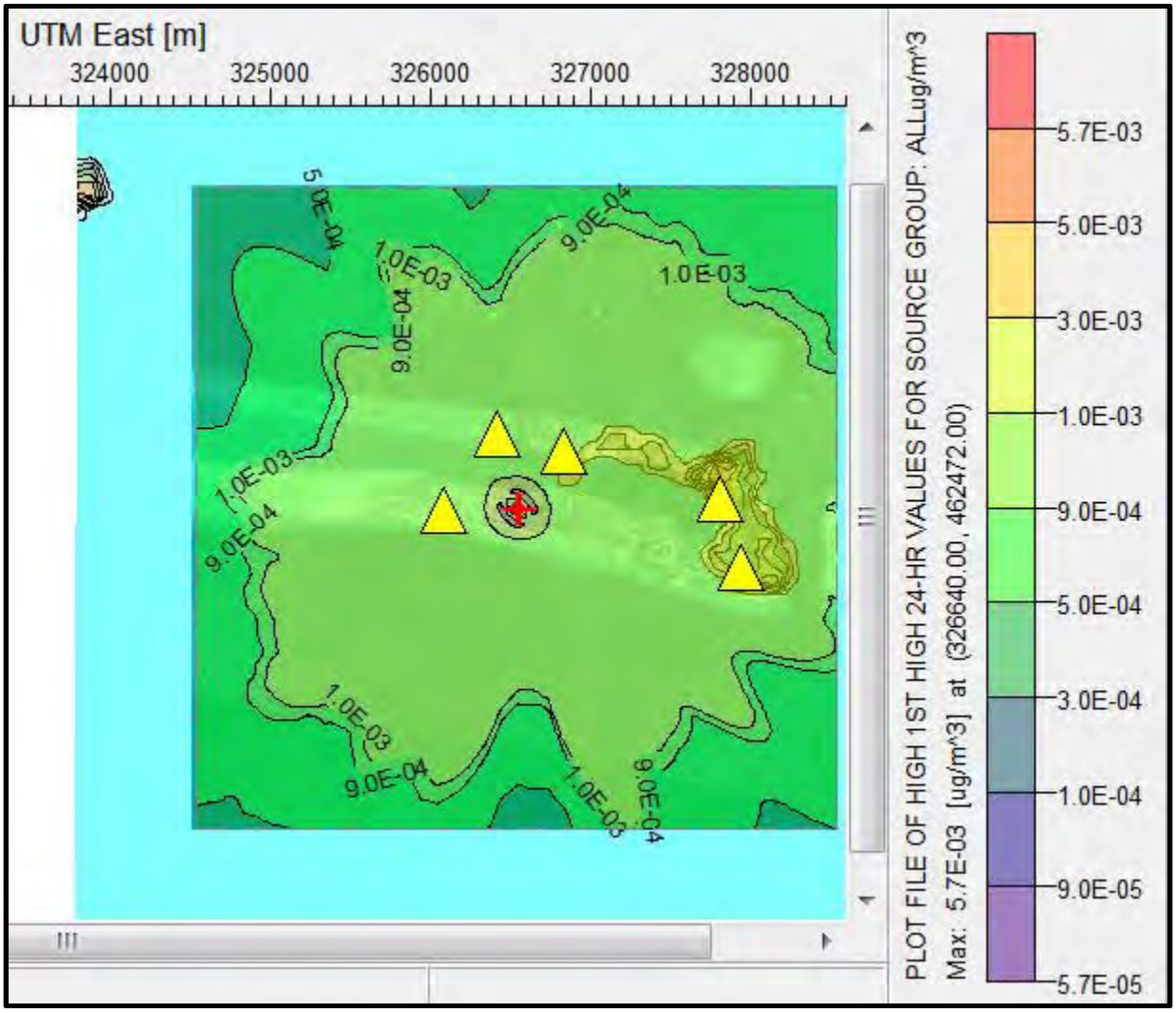

Figure 46: Dioxin and Furans 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

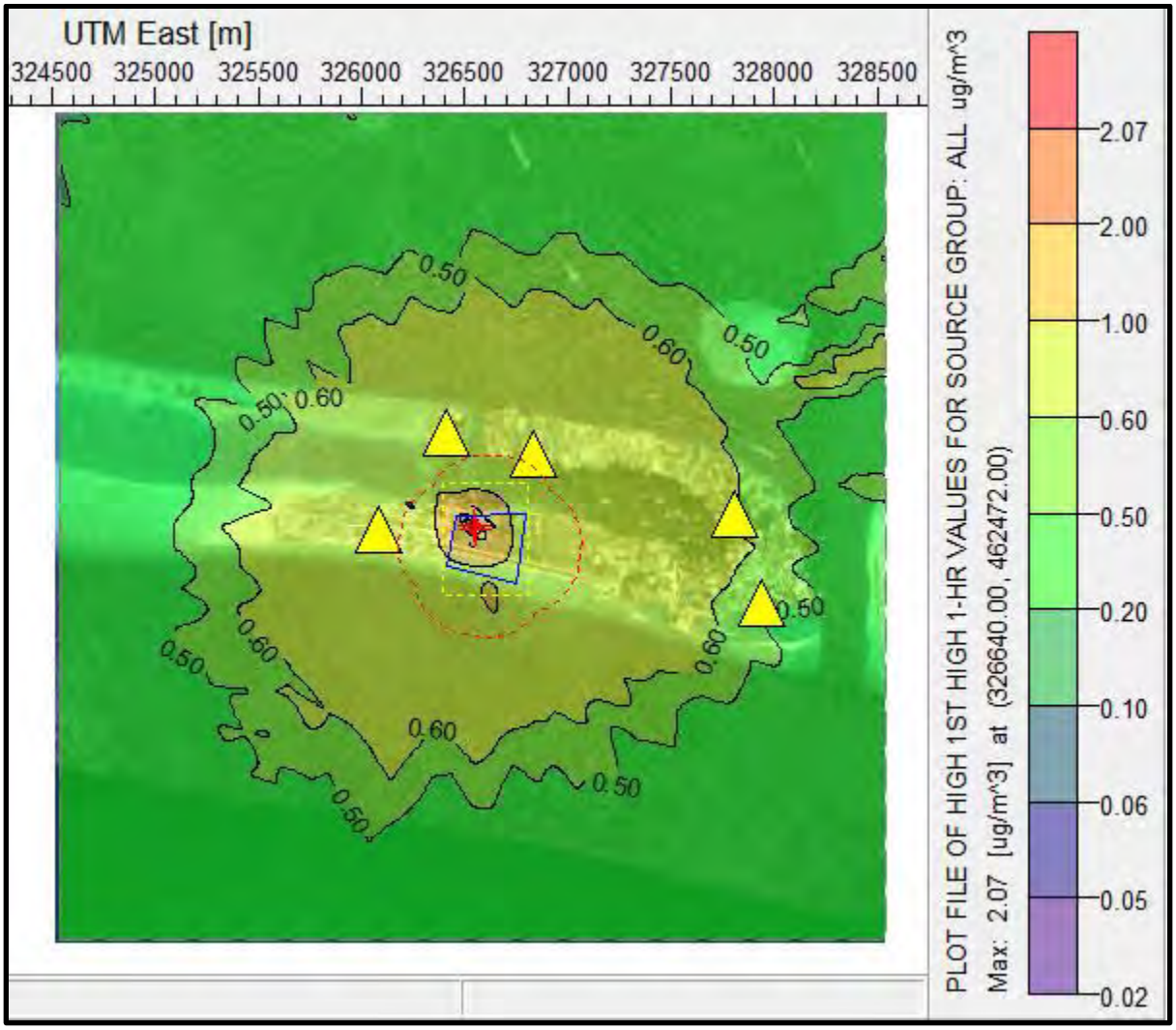

Figure 47: HCl 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

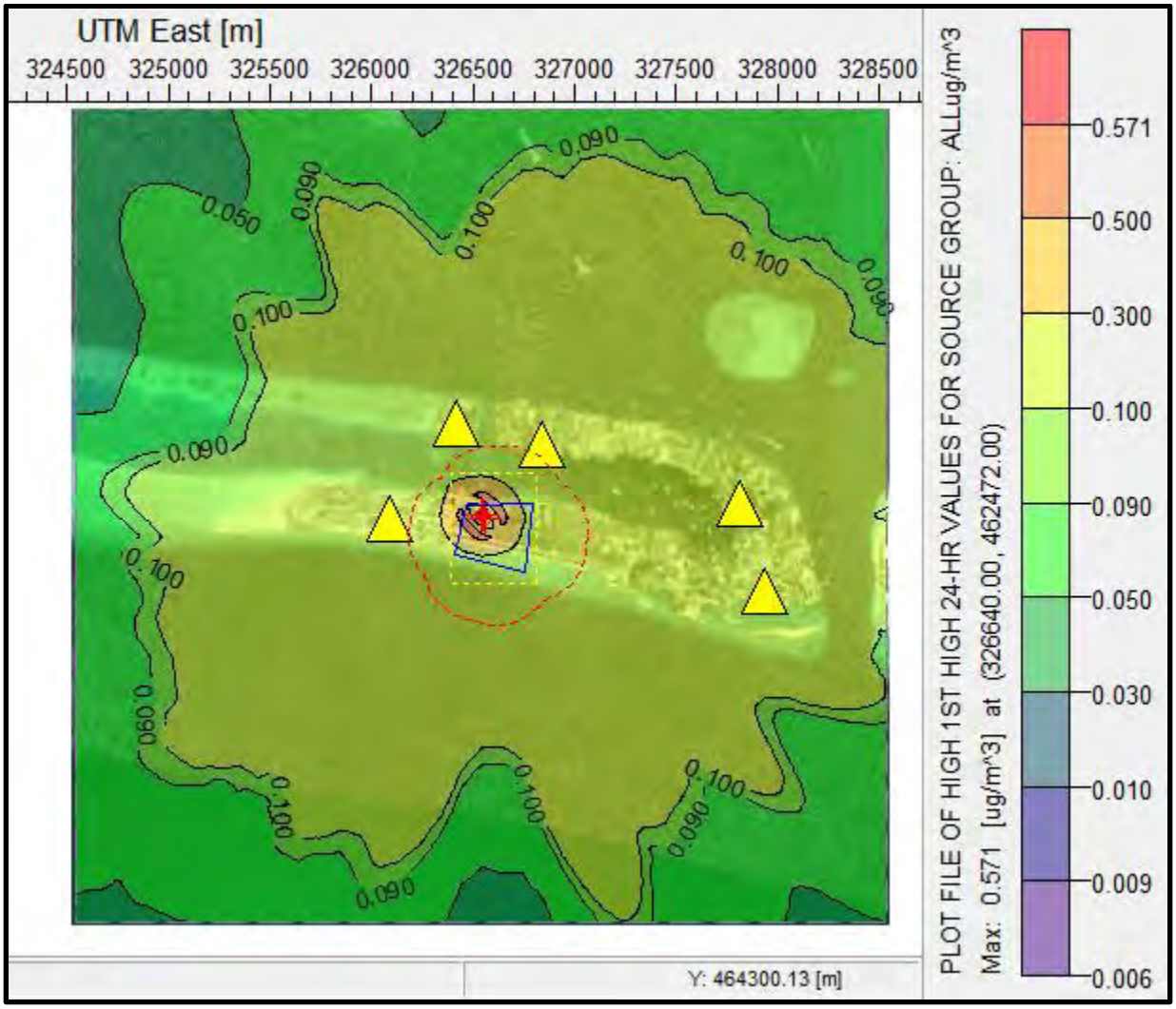

Figure 48: HCl 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

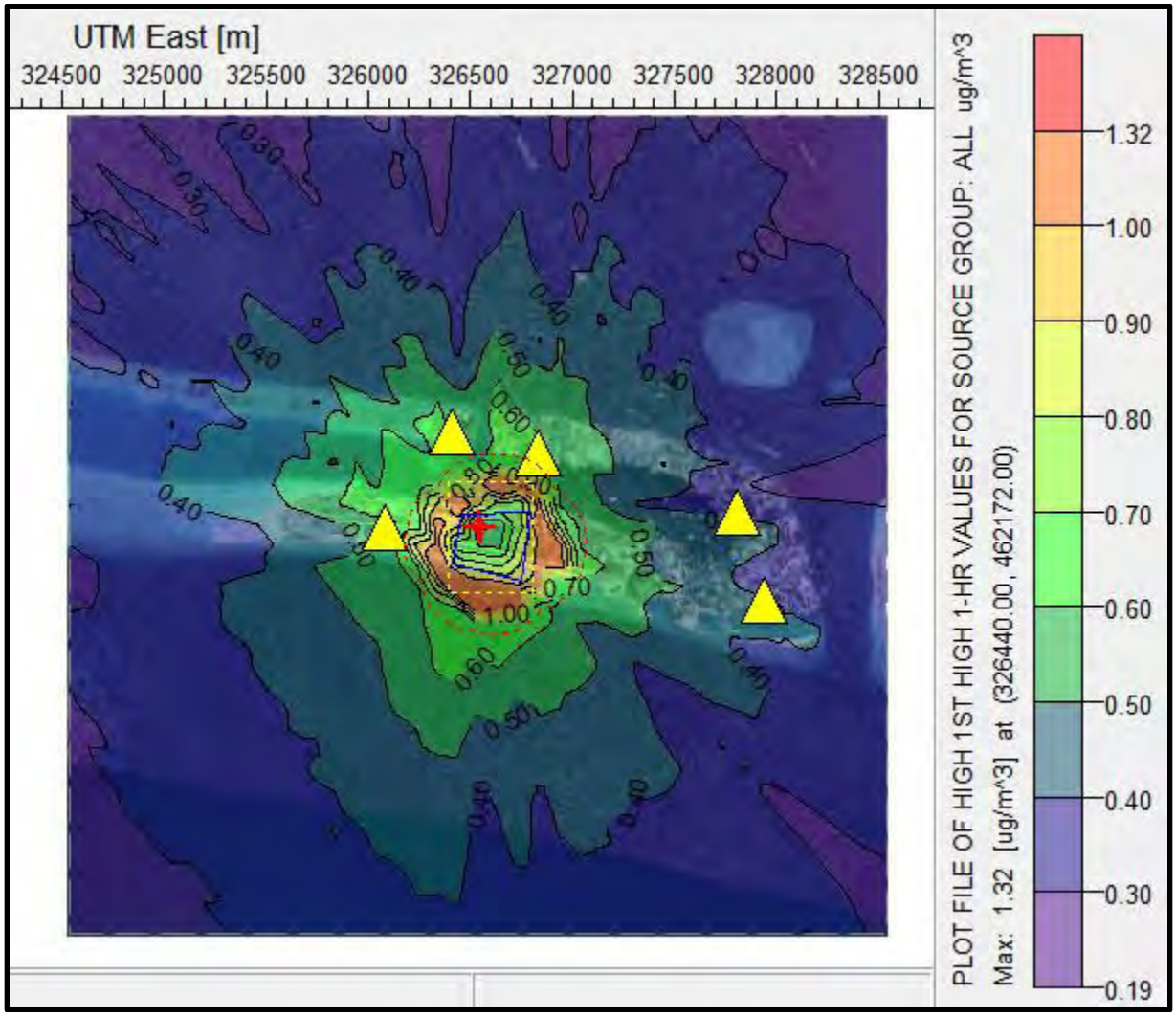

Figure 49: Sb 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

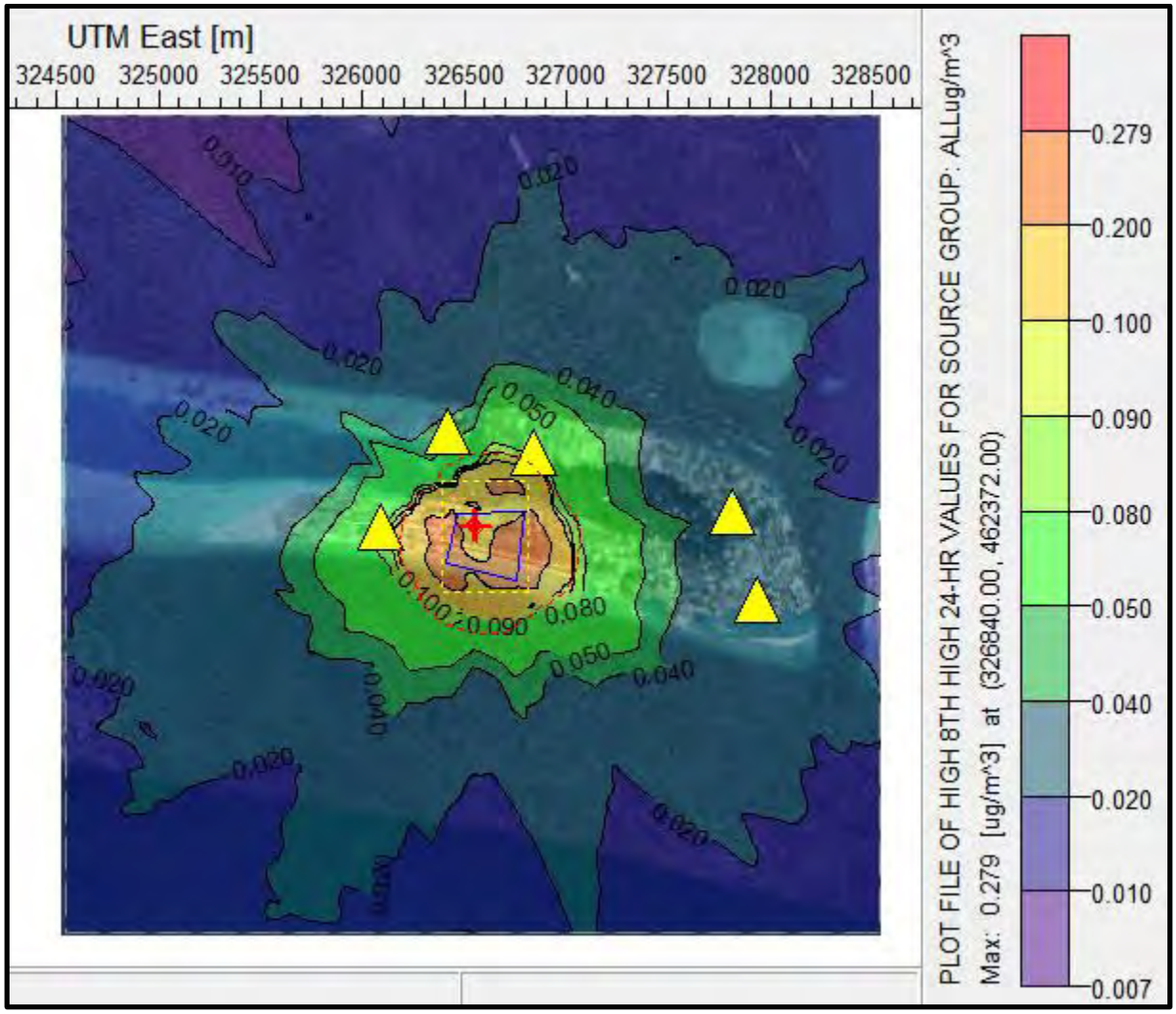

Figure 50: Sb 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

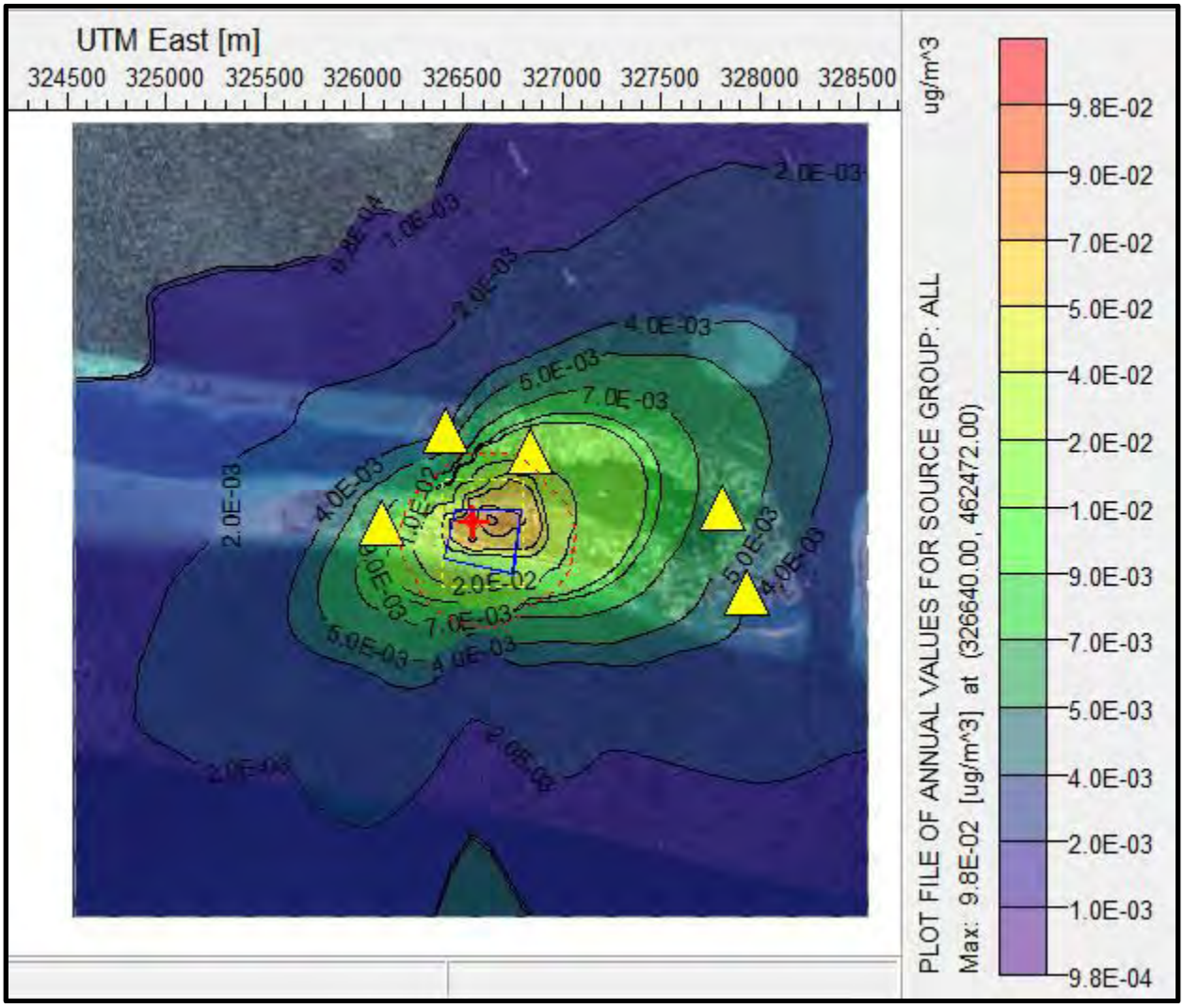

Figure 51: Sb 1 YR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

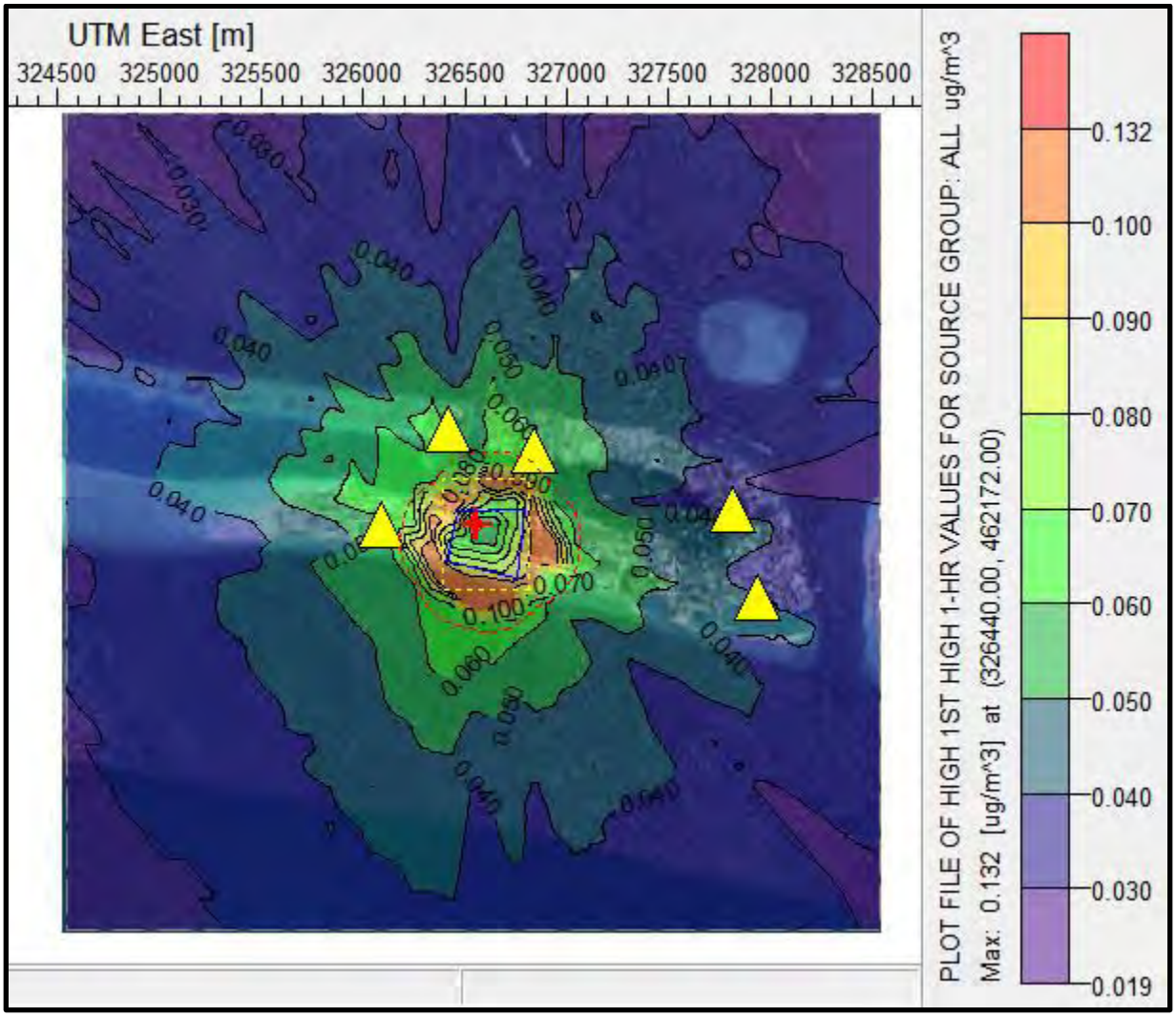

Figure 52: As 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

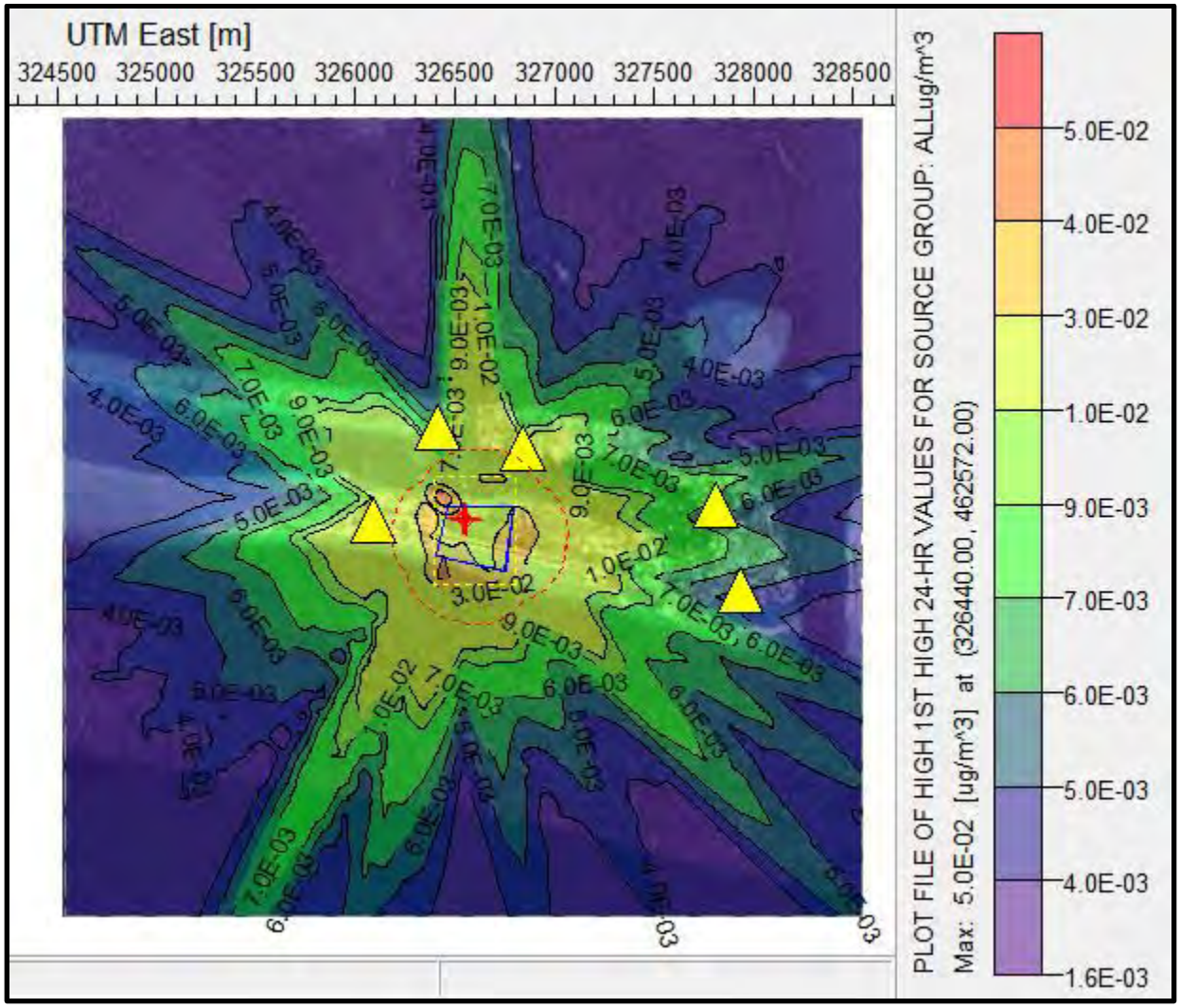

Figure 53: As 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

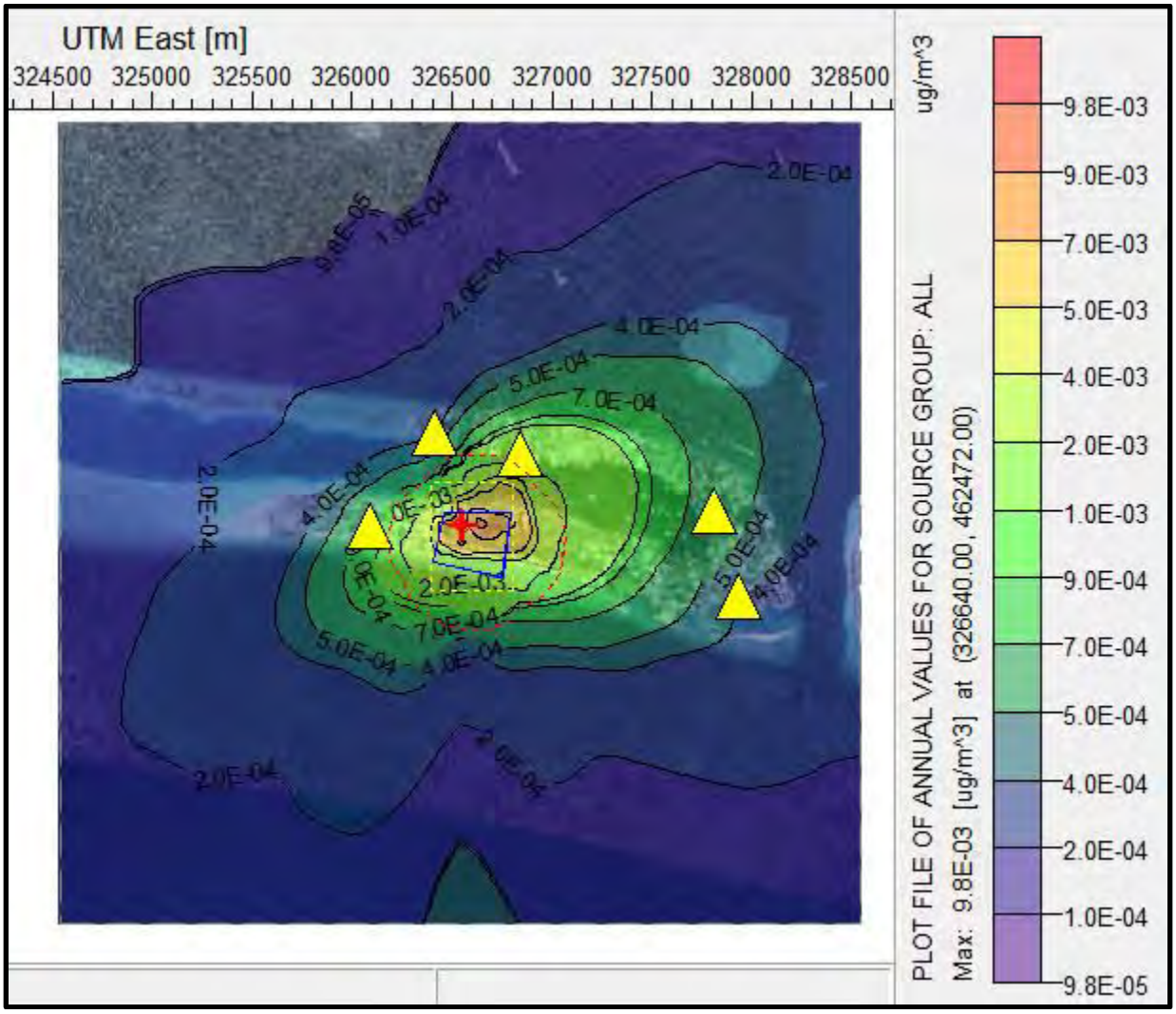

Figure 54: As 1 YR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

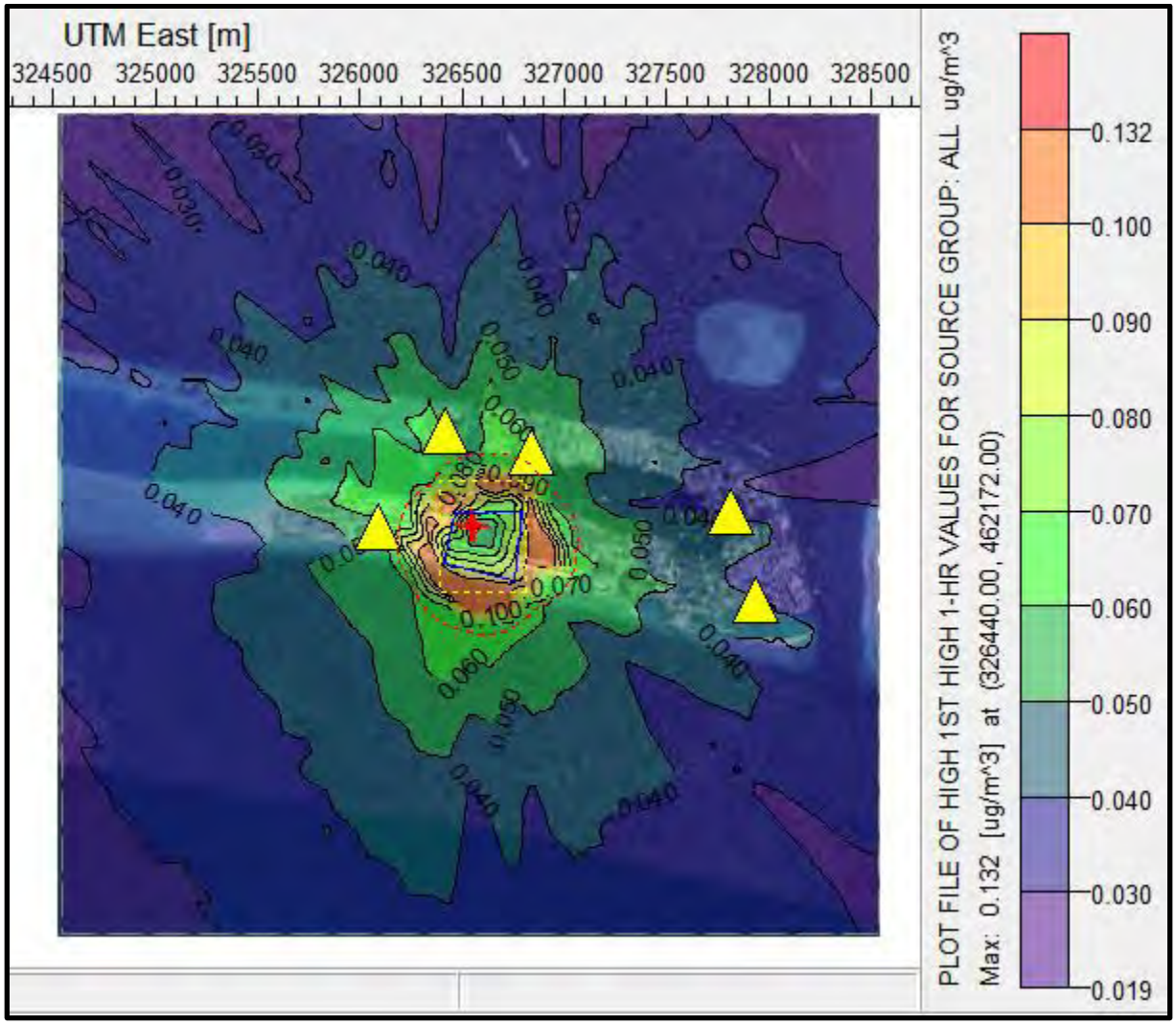

Figure 55: TI 1 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs
Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

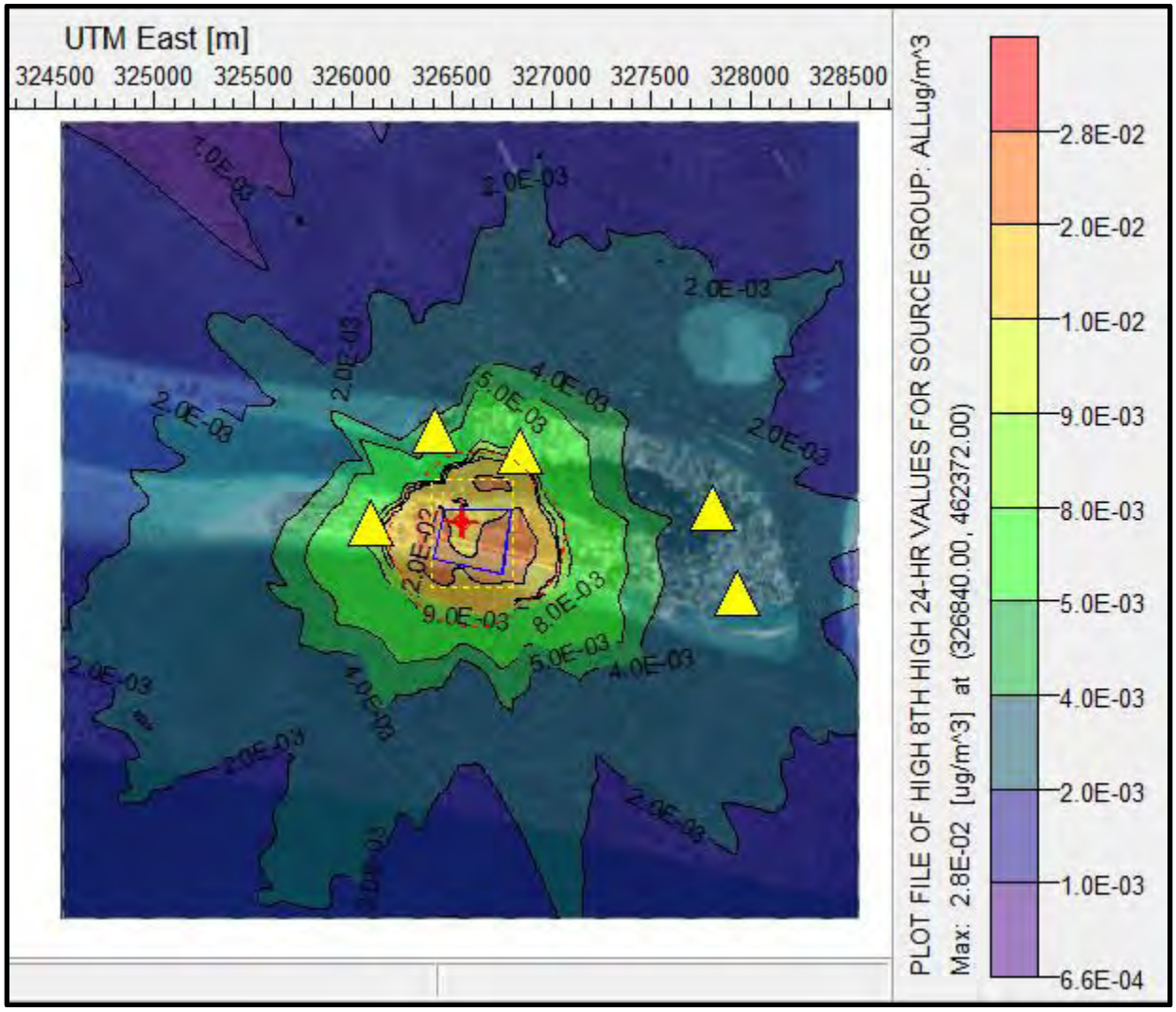

Figure 56: TI 24 HR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

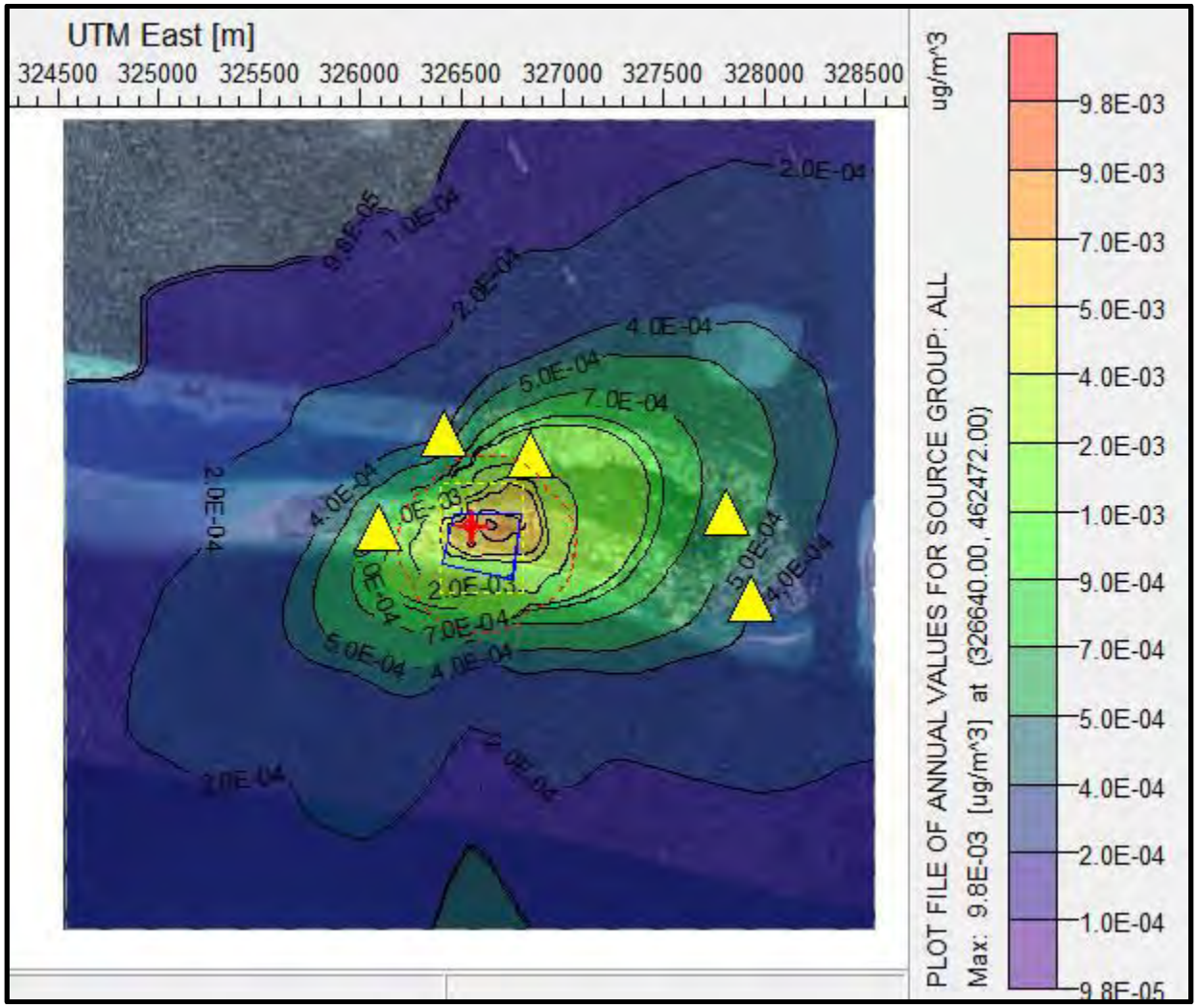

Figure 57: TI 1 YR (Isopleth in microgram/m3)

LEGEND: Yellow Triangles refer to identified ASRs

Area Sensitive Receptor (ASRs)

	Long	Lat
ASR1	327812	462536
ASR2	327938	462105
ASR3	326839	462822
ASR4	326087	462455
ASR5	326416	462929

10. DISCUSSION OF RESULTS

10.1 AERMOD VER.9.1 MODEL RUN USING TIER 3 MET DATA (MALDIVES METEOROLOGY)

Figures 24 to 48 are the results of the predictive peak values of emission dispersion modeling presented in 2 dimensional graphs: 4000 m (4km) X 4000 m (4 km). Dispersion model results are presented in 2-dimension graphical presentation Distance (X-axis) and Concentration ug/Ncm (Y-axis). Raw data of results are in output files presented in the following Nomenclature: (x=distance from source, km), conc=ground-level centerline concentration, ug/m3), (sigmay=dispersion coefficient in Y direction, dimensionless) , (sigmaz=dispersion coefficient in Z direction, dimensionless), (xf=distance to final plume rise, km) , (h=plume height, m).

10.2 TOTAL DUST (TD)

Predicted short term (1 hour) for controlled[14] total dust (TD) maximum ground level concentrations is 7.60 ug/m3 located 280 meters ENE from the center of the domain. The 24 hour controlled total dust (TD) maximum ground level concentrations is 3.188 ug/m3 located 608 meters ENE from the center of the domain. Simulated concentrations for maximum ground level concentration for 1 hour total dust (TD) are generally very low. There is no available the Ambient Air Quality Standards for total dust in the Austal2000 Report. For the total dust (TD) deposition, AERMOD results shows 0.00754 g/m2 for 1 hour, 0.038505 g/m2 for 24 hr, and 0.43394 g/m2 for 1 year deposition. Deposition simulations are all below the TALuft precipitation limit of 0.35 g/m2-d. There are no applicable USEPA standards and WHO Air Quality Guideline Values. Reference center of the domain is the location of the Boiler Stack-1 at Universal Transverse Mercator (UTM) coordinates Easting 326540 and Northing 462472.

10.3 PARTICULATE MATTER 10 (PM-10)

Predicted short term (1 hour) for controlled particulate matter 10 (PM-10) maximum ground level concentrations is 0.102 ug/m3 located 100 meters E from the center of the domain. The 24-hour controlled PM-10 maximum ground level concentrations is 0.02844 ug/m3 located 100 meters E from the center of the domain. Simulated concentration for maximum ground level concentration for 24 hour PM10 is below the 35 ug/m3 TA Luft standards. There is no available Ambient Air Quality Standards for PM-10 in the Austal2000 report. For the PM-10 deposition, AERMOD results shows 0.00037 g/m2 for 1 hour, 0.0007g/m2 for 24 hour and 0.025 g/m2 for 1 year deposition. There is no TALuft limit for PM10 for 1-hour in the Austal2000 report. Results are below TA Luft and WHO Air Quality Guideline Values. There are no USEPA standards in ug/Nm3 unit, the values used are converted from parts per billion by volume (ppbv). The results show insignificant increase of 0.51% for 1-hour, 0.06% for 24-hour, and 0.01% for 1-year. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.4 SULFUR DIOXIDE (SO2)

Predicted short term (1 hour) for controlled sulfur dioxide (SO_2) maximum ground level concentrations is 10.34 ug/m3 located 100 meters E from the center of the domain. The 24 hour controlled SO_2 maximum ground level concentrations is 2.85 ug/m3 located 100 meters E from the center of the domain. For 1-year averaging time, results of maximum concentration is 0.25302 ug/m3. Results for maximum ground level concentration for 1 hour, 24 hour and 1 year SO_2 are all below the TA Luft standards of 350 ug/m3 for 1 hour, 125 ug/m3 for 24 hr and 50 ug/m3 for 1 year respectively. There are no USEPA standards in ug/Nm3 unit, the values used are converted from parts per billion by volume (ppbv). The results show insignificant increase of 4.88% for 1-

[14] Controlled emission parameters refer to post-air pollution control devices. For the WtE, each stack will include baghouse and electostatic precipitators.

hour, 14.29% for 24-hour, and 0.32% for 1-year. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.5 NITROGEN OXIDES (NOX)

Predicted short term (1 hour) for controlled NO_2 maximum ground level concentrations is 48.91 ug/m3 located 100 meters E from the center of the domain. The 24 hour controlled NO_2 maximum ground level concentrations is 14.16 ug/m3 located 100 meters E from the center of the domain. For 1 year averaging time, results of maximum NO_2 concentration is 2.1 ug/m3. Simulated concentration for maximum NO_2 ground level concentration for 1 year is below the TA Luft standards of 40 ug/m3. There are no USEPA standards in parts per billion by volume (ppbv) therefore cannot be converted to ug/Nm3 unit. The results show increase of 24.46% for 1-hour, and 5.25% for 1-year if compared to WHO Air Quality Guidelines. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.6 MERCURY (HG)

Predicted short term (1 hour) for controlled mercury (Hg) maximum ground level concentrations is 0.00643 ug/m3 located 100 meters E from the center of the domain. The 24 hour controlled Hg maximum ground level concentrations is 0.00178 ug/m3 located 100 meters E from the center of the domain. For 1 year averaging time, results of maximum concentration is 0.0057 ug/m3. There are no TA Luft, USEPA standards and WHO Air Quality Guideline Values. The results show insignificant increase of 0.18% for 24-hour and 3.14% for 1-year using TA Luft standards. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.7 AMMONIA (NH3)

Predicted short term (1 hour) for controlled ammonia (NH_3) maximum ground level concentrations is 2.066 ug/m3 located 100 meters E from the center of the domain. The 24 hour controlled NH_3 maximum ground level concentrations is 0.57123 ug/m3 located 100 meters E from the center of the domain. There are no NH_3 TA Luft standards in the Austal2000 report. There are no USEPA standards and WHO Air Quality Guideline Values. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.8 HYDROGEN CHLORIDE (HCL)

Predicted short term (1 hour) for controlled hydrogen chloride (HCl) maximum ground level concentrations is 2.066 ug/m3 located 100 meters E from the center of the domain. The 24 hour controlled NH_3 maximum ground level concentrations is 0.57123 ug/m3 located 100 meters E from the center of the domain. There are no HCl TA Luft standards in the Austal2000 report. There are no USEPA standards and WHO Air Quality Guideline Values. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.9 HYDROGEN FLOURIDE (HFL)

Predicted short term (1 hour) for controlled hydrogen fluoride (HFl) maximum ground level concentrations is 2.066 ug/m3 located 100 meters E from the center of the domain. The 24 hour

controlled HFl maximum ground level concentrations is 0.57123 ug/m3 located 100 meters E from the center of the domain. There are no HFl TA Luft standards in the Austal2000 report. There are no USEPA standards and WHO Air Quality Guideline Values. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.11 DIOXINS AND FURANS (D/F)

Predicted short term (1 hour) for controlled Dioxins and Furans maximum ground level concentrations is 0.0258 ug/m3 located 100 meters E from the center of the domain. The 24 hour controlled Dioxins and Furans maximum ground level concentrations is 0.00569 ug/m3 located 100 meters E from the center of the domain. There are no Dioxins and Furans TA Luft standards in the Austal2000 report. There are no USEPA standards and WHO Air Quality Guideline Values. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.12 SUM OF HEAVY METALS AND THEIR COMPONENTS: ANTIMONY, CHROMIUM,COPPER, MANGANESE, VANADIUM, TIN, LEAD, COBALT, NICKEL (TA LUFT CLASS II AND III)

Predicted short term (1 hour) for the Sum of heavy metals and their components: antimony, chromium,copper, manganese, vanadium, tin, lead, cobalt, nickel (TA Luft class II and III) ground level concentrations is 1.3161 ug/m3 located 316 meters NorthNorthEast (NNE) from the center of the domain. The 24 hour controlled total sum of metals maximum ground level concentrations is 0.4954 ug/m3 located 141 meters NorthWest (NW) from the center of the domain. For 1 year averaging time, results of maximum concentration is 0.0982 ug/m3. Simulated concentrations for maximum ground level concentration for both 1, 24 hours & 1 Year averaging which are generally very low. Results are generally lower than US RSLs for combined 24 hr averaging for Cu, Vn,Cr and Mn of 0.152 ug/m3 and the 3 month NAAQS for Lead of 0.15 ug/m3. There is no available the Ambient Air Quality Standards for said metals in the Austal2000 Report. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.13 ARSENIC / CADMIUM AND ITS COMPOUNDS (EXPRESSED AS AS AND CD), BENZO (A) PYRENE, WATER-SOLUBLE COBALT COMPOUNDS (EXPRESSED AS CO), CHROMIUM (VI) COMPOUNDS (EXPRESSED AS CR) (TA LUFT CLASS I)

Predicted short term (1 hour) for the Sum of heavy metals and their components: Arsenic / cadmium and its compounds (expressed as As and Cd), benzo (a) pyrene, water-soluble cobalt compounds (expressed as Co), chromium (VI) compounds (expressed as Cr) (TA Luft Class I) ground level concentrations is 0.13161 ug/m3 located 316 meters NorthNorthEast (NNE) from the center of the domain. The 24 hour controlled total sum of metals maximum ground level concentrations is 0.049 ug/m3 located 141 meters NorthWest (NW) from the center of the domain. For 1 year averaging time, results of maximum concentration is 0.00982 ug/m3. Simulated concentrations for maximum ground level concentration for both 1, 24 hours & 1 Year averaging which are generally very low. Results are generally lower than the available ESL for Arsenic of 3 ug/m3 and 0.067 ug/m3 for 1 year. There is no available the Ambient Air Quality Standards for said metals in the Austal2000 Report. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.14 THALLIUM AND ITS COMPOUNDS (TA LUFT CLASS I) CADMIUM

Predicted short term (1 hour) for the Sum of heavy metals and their components: Thallium and its compounds (TA Luft class I) cadmium ground level concentrations is 0.13161 ug/m3 located 316 meters NorthNorthEast (NNE) from the center of the domain. The 24 hour controlled total sum of metals maximum ground level concentrations is 0.049 ug/m3 located 141 meters NorthWest (NW) from the center of the domain. For 1 year averaging time, results of maximum concentration is 0.00982 ug/m3. Simulated concentrations for maximum ground level concentration for both 1, 24 hours & 1 Year averaging which are generally very low. There is no available the Ambient Air Quality Standards for said metals in the Austal2000 Report and in the USEPA NAAAQS, ESLs and RSLs. Reference center of the domain is the location of the Boiler Stack-1 at UTM coordinates Easting 326540 and Northing 462472.

10.15 OVERALL RESULTS

AERMOD validation of the Austal2000 model results shows slightly higher results than the Austal2000 report but still within TA Luft Standards, USEPA Standards and WHO Air Quality Guideline Values. For the deposition results, Total Dust, SO2, NO2 and Hg are confirmed to be way below the 1 year TA Luft precipitation standards. Toxic heavy metal parameters such Ni, Ti, As,Cd, and Pb was excluded in the validation model due to absence of design emission data. For all the above parameters, controlled emissions have been validated to be in compliance with the TA Luft Standards as provided in the Austal2000 Report and with the USEPA standards.

Based on the design emission of the proposed WTE plant, proposed stack height of 50 meters in the Austal2000 report was found to be favorable considering all predicted ground level concentrations in the AERMOD validation model are below the TA Luft and USEPA standards.

10.16 AERMOD VER.9.1 MODEL MAXIMUM GROUND LEVEL CONCENTRATIONS IN AREA SENSITIVE RECEPTORS (ASR-GLCMAX)

Results of the dispersion model in Table 8 shows highest predicted ground level concentrations (GLC) in ASRs for TSP, CO SO2 and NO2 for 1-hour and 24-hour period. Predicted peak values for 1 year are below 0.00000 ug/Ncm and considered not significant. GLCs for 1-hour and 24-hour period are all below applicable ambient air quality standards.

Table 8: TABLE OF NOTEABLE PEAK VALUES IN AREA SENSITIVE RECEPTORS AREAS (ASRs)

Receptor ID	Receptor Description		UTM Coordinates		PARAMETERS (ug/Ncm)											
		Direction	Easting (m)	Northing (m)	TD 1 hour	TD 24 hour	PM10 1 hour	PM10 24 hour	NO2 1 hour	NO2 24 hour	SO2 1 hour	SO2 24 hour	Hg 1 hour	Hg 24 hour	D/F 1 hour	D/F 24 hour
Applicable Standards					-	-	20	50	200	-	212	20	-	-	-	-
ASR 1	Industrial	1273.25	327812	462536	0.444	0.188	0.031	0.009	16.672	6.623	3.111	0.922	0.019	0.006	0.023	0.007
ASR 2	Industrial	1445.55	327938	462105	0.395	0.159	0.027	0.008	14.967	5.577	2.712	0.790	0.017	0.005	0.020	0.006
ASR 3	Industrial	459.87	326839	462822	0.656	0.213	0.045	0.014	23.098	7.466	4.537	1.379	0.028	0.009	0.034	0.010
ASR 4	Industrial	453.28	326087	462455	0.634	0.217	0.041	0.014	22.492	7.298	4.144	1.370	0.026	0.009	0.031	0.010
ASR 4	Industrial	473.64	326416	462929	0.713	0.216	0.043	0.012	24.549	7.393	4.351	1.206	0.027	0.008	0.032	0.009

11. RECOMMENDATIONS

The WTE Boilers should be regularly maintained and structure of the stack, ducts should be regularly checked up to avoid fugitive dusts sources and particulate accumulation. Biomass and municipal fuel should have an acceptance criteria such as moisture content and toxic characterization. Waste should be dried to eliminate moisture which is a precursor to incomplete combustion which is among major contributors to Particulate Matter (PM) and Carbon Monoxide (CO) emission. Control device such as the Dry scrubber and Baghouse is also recommended for regular check-up and maintenance.

Other control measures outside the facility are also recommended which include, periodic watering of roads for, minimizing generation and resuspension of dust particles. Forestation and plantation in perimeter-buffer areas are other effective controls. These areas will be protected by vegetation walls from dispersion of air pollutants. Other cleaner production measures are recommended.

Regular Ambient Air quality monitoring should be conducted in hot spots and impacts areas based on the results of this modelling report. Actual ambient monitoring may be treated as validation of model results. Every modification and installation of new sources should be considered by proponent as additional contribution to emission of the Power plant, hence modelling updates should also be conducted to determine assimilative carrying capacity of the area based on the impacts of the plant to the environment. These efforts will contribute to recommendations of the plant's overall management efforts to abate air pollution thus performing corporate responsibility to the environment and natural resources. It recommended to (i) retain the four (4) ambient monitoring stations used in conducting ambient air quality in Thillafushi island for the EIA study; and (ii) put up additional ambient monitoring stations in ASR 2, ASR 3 and ASR 5 areas due to industrial facilities with workers quarters.

According to WHO best practices in WTE plant, proper combustion design is among the important factor in reduction of emission. Proper design and operation of incinerators should achieve desired temperatures, residence times, and other conditions necessary to destroy pathogens, minimize emissions, avoid clinker formation and slagging of the ash (in the primary chamber), avoid refractory damage destruction, and minimize fuel consumption. Good combustion practice (GCP) elements also should be followed to control dioxin and furan emissions (Brna and Kilgroe 1989)[15]. Regardless of how well equipment is designed, wear and tear during normal use and poor operation and maintenance practices will lead to the deterioration of components, a resultant decrease in both combustion quality, an increase in emissions, and potential risks to the operator and public. Operation and maintenance also affect reliability, effectiveness and life of the equipment. Essentially all components of small-scale incinerators are prone to failure and require maintenance. Maintenance on an hourly to semi-annual schedule is required (EPA 1990). See Annex 1 and 2.

Background ambient air quality was not accounted in the modeling run. However given there are no potential significant sources of air pollution (such as mobile, area, line sources, community and other air-pollutant emitting industries) near the WTE plant, the results of both the Austal2000 and AERMOD models are generally acceptable and can be seen as below TA Luft and USEPA Standards. However, it is highly recommended to conduct a validation run after 1 to 3 months during operations stage using actual CEMS, stack testing, and ambient air monitoring results.

[15] WHO Best Practices in Incineration, EPA (1990), UNDP (2003), and De Montfort literature.

12. RECOMMENDED AMBIENT AIR QUALITY MONITORING STATIONS

Recommended to put up addition Monitoring stations in the ASR 2, ASR 3 and ASR 5 areas. Below is the receptor map of with identified Area Sensitive Receptor primary impact areas and location of Existing Ambient Air Quality Monitoring Stations . In cases of exceedance, these areas are likely to be affected.

Figure 58: Recommended monitoring sites.

ANNEXES

ANNEX-1: WHO Best Practice in WTE plant - Recommended Operating Parameters

Table 2 Recommendations of key design/operating parameters for small-scale intermittent incinerators.

Derived in part from EPA (1990), UNDP (2003), and De Montfort literature.

Type	*Parameter*	*Recommendation*
Capacity	Destruction rate, safety boxes capacity	District/subdistricts in Taylor (2003) that regularly used incinerators destroyed an average of 58 safety boxes per month, about 14 per week, equivalent to ~12 kg/week. Remote areas may only generate 1 kg per month. Proper sizing is important. Ideally, unit should burn for long periods (~4 hrs) to save fuel. (De Montfort units are not suitable for short sharp burns without a warm up period, though this appears to be common practice).
Temperatures	Primary chamber Secondary chamber Gas entering air pollution control devices, if any	540 to 980 C 980 to 1200 C (EPA 1990 recommendations) >850/1100* C (S. African and EU standards) >1000/1100* C (Indian and Thai standards) * more than 1% chlorinated organic matter in waste <230 C
Residence times	Gas (secondary chamber)	>1 s
Air flows	Total combustion air Supply and distribution of air in the incinerator Mixing of combustion gas and air in all zones Particulate matter entrainment into flue gas leaving the incinerator	140 – 200% excess Adequate Good mixing Minimize by keeping moderate air velocity to avoid fluidization of the waste, especially if high (>2%) ash waste is burned.
Controls & Monitoring	Temperature and many other parameters	Continuous for some, periodic for others
Waste	Waste destruction efficiency	>90% by weight
	Uniform waste feed Minimizing emissions of HCl, D/F, metals, other pollutants Load/charge only when incinerator operating conditions are appropriate	Uniform waste feed, and avoid overloading the incinerator Avoid plastics that contain chlorine (polyvinyl chloride products, e.g., blood bags, IV bags, IV tubes, etc. Avoid heavy metals, e.g., mercury from broken thermometers etc. Pre-heat incinerator and ensure temperatures above 800 C. Avoid overheating.
Enclosure	Roof	A roof may be fitted to protect the operator from rain, but only minimum walls.
Chimney	Height	At least 4 – 5 m high, needed for both adequate dispersion plus draft for proper air flow.
Pollution control equipment	Installing air pollution control devices (APCD)	Most frequently used controls include packed bed, venturi or other wet scrubbers, fabric filter typically used with a dry injection system, and infrequently electrostatic precipitator (ESP). Modern emission limits cannot be met without APCD.

ANNEX-2: WHO Best Practice in WTE plant - Typical Maintenance Schedule for Incinerators

Table 4. Typical maintenance schedule for incinerators (derived in part from EPA 1990).

Activity Frequency	*Component*	*Procedure*
Hourly	Ash removal	Inspect and clean as required
Daily	Temperature, pollution monitors, if any	Check operation
	Underfire air ports	Inspect and clean as required
	Door seals	Inspect for wear, closeness of fit, air leakage
	Ash pit	Clean after each shift
Weekly	Latches, hinges, wheels, etc.	Lubricate if applicable
Monthly	External surfaces of incinerator and chimney (stack)	Inspect external hot surfaces. White spots or discoloration may indicate loss of refractory
	Refractory	Inspect and repair minor wear with refractory cement
	Upper/secondary combustion chamber	Inspect and remove particulate matter accumulated on chamber floor
Semi-annually	Hot external surfaces	Inspect and paint with high temperature paint as required
	Ambient external surfaces	Inspect and paint as required

ANNEX 3: MALDIVES MM5 2018 METEROLOGICAL DATA SCREENSHOT PROFILE MET DATA

	Year	Month	Day	Hour	Measurement Height [m]	1, if this is the last (highest) level for this hour, or 0 otherwise	Direction the wind is blowing from for the current level [degrees]	Wind Speed for the current level [m/s]	Temperature at the current level [C]	Standard deviation of the wind direction fluctuations [degrees]	Standard deviation of the vertical wind speed fluctuations [m/s]
Min.	2018	Jan	1	1	10.0	1	0.0	0.00	24.4	99.0	99.00
Max.	2018	Dec	31	24	10.0	1	360.0	14.90	30.6	99.0	99.00
Graph					☐	☐	☐	☐	☑	☐	☐
1	2018	Jan	1	1	10.0	1	41.0	7.20	28.1	99.0	99.00
2	2018	Jan	1	2	10.0	1	38.0	6.70	27.9	99.0	99.00
3	2018	Jan	1	3	10.0	1	44.0	6.20	27.9	99.0	99.00
4	2018	Jan	1	4	10.0	1	43.0	6.70	28.0	99.0	99.00
5	2018	Jan	1	5	10.0	1	63.0	4.60	27.4	99.0	99.00
6	2018	Jan	1	6	10.0	1	62.0	4.60	27.2	99.0	99.00
7	2018	Jan	1	7	10.0	1	65.0	5.10	27.2	99.0	99.00
8	2018	Jan	1	8	10.0	1	63.0	5.10	27.4	99.0	99.00
9	2018	Jan	1	9	10.0	1	47.0	5.10	27.5	99.0	99.00
10	2018	Jan	1	10	10.0	1	51.0	4.60	27.5	99.0	99.00
11	2018	Jan	1	11	10.0	1	54.0	4.60	27.6	99.0	99.00
12	2018	Jan	1	12	10.0	1	46.0	4.60	27.6	99.0	99.00
13	2018	Jan	1	13	10.0	1	53.0	4.10	27.6	99.0	99.00
14	2018	Jan	1	14	10.0	1	49.0	4.10	27.6	99.0	99.00
15	2018	Jan	1	15	10.0	1	52.0	4.10	27.6	99.0	99.00
16	2018	Jan	1	16	10.0	1	54.0	4.10	27.6	99.0	99.00
17	2018	Jan	1	17	10.0	1	61.0	4.10	27.6	99.0	99.00
18	2018	Jan	1	18	10.0	1	57.0	4.10	27.5	99.0	99.00

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ANNEX 4: MALDIVES MM5 2018 METEROLOGICAL DATA SCREENSHOT SURFACE MET DATA)

	Year	Month	Day	Julian Day	Hour	Surface Roughness Length [m]	Bowen Ratio	Albedo	Wind Speed - Ws [m/s]	Wind Direction - Wd [degrees]	Reference Height for Ws and Wd [m]	Temperature - temp [K]	Reference Height for temp [m]	Precipitation Code	Precipitation Rate [mm/hr]	Relative Humidity [%]	Surface Pressure [mb]	Cloud Cover [tenths]	Data Flag
Min.	2018	Jan	1	1	1	0.000	0.45	0.14	0.00	0.0	10.0	297.5	2.0	0	0.00	57.0	1004.0	2	
Max.	2018	Dec	31	365	24	0.000	0.45	1.00	14.90	360.0	10.0	303.8	2.0	11	48.01	98.0	1015.0	10	
Graph						☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
1	2018	Jan	1	1	1	0.000	0.45	1.00	7.20	41.0	10.0	301.2	2.0	0	0.00	76.0	1007.0	3	NAD-SFC NoSubs
2	2018	Jan	1	1	2	0.000	0.45	0.58	6.70	38.0	10.0	301.0	2.0	11	0.51	76.0	1007.0	4	NAD-SFC NoSubs
3	2018	Jan	1	1	3	0.000	0.45	0.25	6.20	44.0	10.0	301.0	2.0	11	1.52	76.0	1007.0	10	NAD-SFC NoSubs
4	2018	Jan	1	1	4	0.000	0.45	0.17	6.70	43.0	10.0	301.1	2.0	11	2.54	75.0	1006.0	10	NAD-SFC NoSubs
5	2018	Jan	1	1	5	0.000	0.45	0.15	4.60	63.0	10.0	300.5	2.0	0	0.00	74.0	1007.0	6	NAD-SFC NoSubs
6	2018	Jan	1	1	6	0.000	0.45	0.14	4.60	62.0	10.0	300.4	2.0	0	0.00	74.0	1006.0	6	NAD-SFC NoSubs
7	2018	Jan	1	1	7	0.000	0.45	0.14	5.10	65.0	10.0	300.4	2.0	11	0.51	74.0	1007.0	5	NAD-SFC NoSubs
8	2018	Jan	1	1	8	0.000	0.45	0.14	5.10	63.0	10.0	300.5	2.0	11	0.51	73.0	1008.0	4	NAD-SFC NoSubs
9	2018	Jan	1	1	9	0.000	0.45	0.14	5.10	47.0	10.0	300.6	2.0	0	0.00	73.0	1008.0	4	NAD-SFC NoSubs
10	2018	Jan	1	1	10	0.000	0.45	0.15	4.60	51.0	10.0	300.6	2.0	0	0.00	72.0	1008.0	3	NAD-SFC NoSubs
11	2018	Jan	1	1	11	0.000	0.45	0.16	4.60	54.0	10.0	300.8	2.0	0	0.00	72.0	1009.0	3	NAD-SFC NoSubs
12	2018	Jan	1	1	12	0.000	0.45	0.21	4.60	46.0	10.0	300.8	2.0	0	0.00	72.0	1009.0	3	NAD-SFC NoSubs

ANNEX 5: AERMOD VER. 9.7 SAMPLE PLOT FILES

AERMOD (180											
AERMET (180	81):										
MODELING OPT	IONS USED: R	egDFAULT CONC	DEPOS ELEV	DRYDPL T	WETDP LT	RURAL					
PLOT	FILE OF HIGH	1ST HIGH 1-HR	VALUES FOR	SOURCE GR	OUP: ALL						
FOR	A TOTAL OF 16	81 RECEPTORS.									
FORM	AT: (2(1X,F13	.5),2(1X,F13.6)	,3(1X,F8.2) ,3	X,A6,2X,A	8,2X,A5 ,5	X,A8,2X,I8)					
X	Y	AVERAGE CONC	TOTAL DEPO	ZELEV	ZHILL	ZFLA G	AVE	GRP	RANK	NET ID	DATE(CO NC)
_____	_____	_____	_____	_____	_____	____	____	_____	_____	_____	_____
324540	460472	2.374824	0.000061	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
324640	460472	2.413572	0.000074	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
324740	460472	2.535744	0.000076	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
324840	460472	2.589547	0.000065	0	0	0	1-HR	ALL	1ST	UCAR T1	18111222
324940	460472	2.466475	0.000078	0	0	0	1-HR	ALL	1ST	UCAR T1	18031324
325040	460472	2.622971	0.000079	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325140	460472	2.901938	0.000083	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325240	460472	2.66411	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524

325340	460472	2.219997	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325440	460472	2.410293	0.00017	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325540	460472	2.662954	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325640	460472	2.867137	0.000093	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
325740	460472	3.040216	0.000094	0	0	0	1-HR	ALL	1ST	UCAR T1	18031217
325840	460472	2.76666	0.000223	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
325940	460472	2.807048	0.000162	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326040	460472	2.668708	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326140	460472	2.95032	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326240	460472	3.06731	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326340	460472	3.149194	0.000123	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	460472	2.075674	0.000085	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	460472	2.448601	0.000051	0	0	0	1-HR	ALL	1ST	UCAR T1	18111224
326640	460472	2.860178	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18032921
326740	460472	2.584067	0.000191	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	460472	2.123774	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326940	460472	0.969399	0.000063	0	0	0	1-HR	ALL	1ST	UCAR T1	18022415

327040	460472	2.054241	0.000155	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
327140	460472	2.794409	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327240	460472	1.988173	0.000189	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327340	460472	2.513959	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327440	460472	2.689533	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327540	460472	2.526455	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327640	460472	3.289062	0.000072	0	0	0	1-HR	ALL	1ST	UCAR T1	18120613
327740	460472	2.698515	0.000119	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327840	460472	2.282734	0.00014	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327940	460472	2.398733	0.000118	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
328040	460472	2.661739	0.000073	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
328140	460472	2.28584	0.000087	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
328240	460472	2.167104	0.000098	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328340	460472	2.358745	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328440	460472	2.439526	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328540	460472	2.830803	0.000116	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
324540	460572	2.476907	0.000044	0	0	0	1-HR	ALL	1ST	UCAR T1	18032015

324640	460572	2.411789	0.000064	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
324740	460572	2.473296	0.000078	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
324840	460572	2.536927	0.000079	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
324940	460572	2.675003	0.00007	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325040	460572	2.611885	0.000084	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325140	460572	2.544284	0.000085	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325240	460572	3.066763	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325340	460572	2.490947	0.000105	0	0	0	1-HR	ALL	1ST	UCAR T1	18021402
325440	460572	2.170551	0.000188	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325540	460572	2.697089	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325640	460572	2.774787	0.0001	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325740	460572	2.751654	0.000089	0	0	0	1-HR	ALL	1ST	UCAR T1	18031217
325840	460572	2.843775	0.000191	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
325940	460572	3.012101	0.000225	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326040	460572	2.968065	0.000143	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326140	460572	3.113224	0.000206	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326240	460572	3.126203	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219

326340	460572	3.323759	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	460572	2.277121	0.000095	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	460572	2.570275	0.000053	0	0	0	1-HR	ALL	1ST	UCAR T1	18111224
326640	460572	2.979753	0.000158	0	0	0	1-HR	ALL	1ST	UCAR T1	18032921
326740	460572	2.753826	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	460572	2.027717	0.000081	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326940	460572	1.169945	0.000089	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
327040	460572	2.460832	0.00018	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327140	460572	2.654439	0.000192	0	0	0	1-HR	ALL	1ST	UCAR T1	18102615
327240	460572	2.327265	0.000193	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327340	460572	2.500134	0.000232	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327440	460572	2.615254	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327540	460572	3.02735	0.000084	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327640	460572	3.252858	0.000108	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327740	460572	2.325895	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327840	460572	2.51069	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327940	460572	2.685712	0.000093	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124

328040	460572	2.535751	0.000087	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
328140	460572	2.19849	0.000096	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328240	460572	2.320417	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328340	460572	2.483393	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328440	460572	2.867275	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328540	460572	3.013515	0.000089	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
324540	460672	2.480257	0.000076	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324640	460672	2.544249	0.000049	0	0	0	1-HR	ALL	1ST	UCAR T1	18032015
324740	460672	2.441197	0.000067	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
324840	460672	2.525983	0.000083	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
324940	460672	2.567781	0.000082	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325040	460672	2.736948	0.00008	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325140	460672	2.777259	0.000093	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325240	460672	2.819911	0.00009	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325340	460672	3.089893	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325440	460672	2.320247	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325540	460672	2.249166	0.000204	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613

325640	460672	2.850349	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325740	460672	2.921606	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
325840	460672	3.140232	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
325940	460672	2.997056	0.00027	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326040	460672	3.068161	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18120801
326140	460672	3.236382	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326240	460672	3.094962	0.000143	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326340	460672	3.462126	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	460672	2.497472	0.000106	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	460672	2.699874	0.000056	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	460672	3.09835	0.000176	0	0	0	1-HR	ALL	1ST	UCAR T1	18032921
326740	460672	2.914469	0.000207	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	460672	1.882312	0.000074	0	0	0	1-HR	ALL	1ST	UCAR T1	18021521
326940	460672	1.358637	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
327040	460672	2.794293	0.000216	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327140	460672	2.29268	0.000214	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327240	460672	2.497904	0.000243	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524

327340	460672	2.896369	0.000217	0	0	0	1-HR	ALL	1ST	UCAR T1	18012414
327440	460672	2.792391	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327540	460672	3.491811	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327640	460672	2.561642	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327740	460672	2.455956	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327840	460672	2.704715	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327940	460672	2.768546	0.000083	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
328040	460672	2.241863	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328140	460672	2.367794	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328240	460672	2.516468	0.000143	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328340	460672	2.982914	0.000135	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328440	460672	3.119754	0.000095	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328540	460672	2.553128	0.000084	0	0	0	1-HR	ALL	1ST	UCAR T1	18042417
324540	460772	2.539268	0.000095	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324640	460772	2.562768	0.000084	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324740	460772	2.603724	0.000055	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324840	460772	2.460538	0.000071	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517

324940	460772	2.568544	0.000089	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325040	460772	2.736606	0.000084	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325140	460772	2.764052	0.00009	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325240	460772	2.891013	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325340	460772	3.16679	0.000094	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325440	460772	2.915477	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325540	460772	2.032895	0.000207	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325640	460772	2.624634	0.000179	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325740	460772	2.862059	0.00011	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325840	460772	2.980309	0.000106	0	0	0	1-HR	ALL	1ST	UCAR T1	18031217
325940	460772	2.843978	0.000269	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326040	460772	3.147629	0.000188	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326140	460772	3.167473	0.000236	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326240	460772	3.264755	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326340	460772	3.543019	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	460772	2.735695	0.000118	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	460772	2.83701	0.000061	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804

326640	460772	3.212116	0.000196	0	0	0	1-HR	ALL	1ST	UCAR T1	18032921
326740	460772	3.05429	0.00021	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	460772	1.684929	0.000075	0	0	0	1-HR	ALL	1ST	UCAR T1	18021521
326940	460772	1.663129	0.000163	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
327040	460772	2.955724	0.000241	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327140	460772	1.901688	0.000239	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327240	460772	2.474966	0.000287	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327340	460772	2.890422	0.000215	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327440	460772	3.374517	0.000096	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327540	460772	3.260158	0.00014	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327640	460772	2.19033	0.000177	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327740	460772	2.685471	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327840	460772	2.954873	0.000083	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327940	460772	2.25429	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
328040	460772	2.532223	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328140	460772	2.54737	0.000153	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328240	460772	3.101918	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316

328340	460772	3.225295	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328440	460772	2.66197	0.000088	0	0	0	1-HR	ALL	1ST	UCAR T1	18042417
328540	460772	3.033928	0.000093	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
324540	460872	2.47522	0.000083	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324640	460872	2.631176	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324740	460872	2.645015	0.000094	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324840	460872	2.6514	0.000062	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324940	460872	2.495426	0.000075	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325040	460872	2.59702	0.000096	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325140	460872	2.904373	0.000086	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325240	460872	2.742096	0.000103	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325340	460872	2.921093	0.000112	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325440	460872	3.408148	0.000116	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325540	460872	2.835267	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325640	460872	2.31975	0.000243	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325740	460872	3.026894	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325840	460872	2.897978	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218

325940	460872	3.060215	0.000214	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326040	460872	3.435097	0.000279	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326140	460872	2.950693	0.000219	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326240	460872	3.322787	0.000198	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326340	460872	3.540337	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	460872	2.988556	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	460872	2.980708	0.000065	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	460872	3.31546	0.000218	0	0	0	1-HR	ALL	1ST	UCAR T1	18032921
326740	460872	3.156816	0.00021	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	460872	1.438362	0.000072	0	0	0	1-HR	ALL	1ST	UCAR T1	18021521
326940	460872	2.146125	0.000197	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327040	460872	2.845	0.000244	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327140	460872	2.262851	0.000247	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327240	460872	3.056728	0.000267	0	0	0	1-HR	ALL	1ST	UCAR T1	18012414
327340	460872	3.09869	0.000177	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327440	460872	3.645706	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327540	460872	2.323518	0.000185	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124

327640	460872	2.504975	0.000176	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327740	460872	3.05333	0.000109	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327840	460872	2.452437	0.000109	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
327940	460872	2.697457	0.000156	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
328040	460872	2.641707	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328140	460872	3.222615	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328240	460872	3.327254	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328340	460872	2.763912	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18042417
328440	460872	3.1449	0.000104	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328540	460872	2.764726	0.000108	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
324540	460972	2.560175	0.0001	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324640	460972	2.494151	0.000081	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324740	460972	2.691251	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324840	460972	2.704401	0.000104	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324940	460972	2.682114	0.000071	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325040	460972	2.626936	0.00008	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325140	460972	2.6064	0.000103	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323

325240	460972	3.062609	0.00009	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325340	460972	2.749911	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325440	460972	2.857044	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325540	460972	3.447838	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325640	460972	2.489146	0.000218	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325740	460972	2.938728	0.000225	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325840	460972	2.888626	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325940	460972	3.264591	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326040	460972	3.34226	0.000342	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326140	460972	3.271353	0.000176	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326240	460972	3.31234	0.000258	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326340	460972	3.542907	0.000219	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	460972	3.249185	0.000147	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	460972	3.129085	0.00007	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	460972	3.400422	0.000242	0	0	0	1-HR	ALL	1ST	UCAR T1	18032921
326740	460972	3.19997	0.000203	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	460972	1.153428	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18022415

326940	460972	2.625634	0.00026	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327040	460972	2.426231	0.000276	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327140	460972	2.294318	0.000343	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327240	460972	3.166153	0.000267	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327340	460972	3.774293	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327440	460972	3.125776	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327540	460972	2.309048	0.000206	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327640	460972	3.012108	0.000143	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327740	460972	2.775257	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
327840	460972	2.854705	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327940	460972	2.727822	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328040	460972	3.342406	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328140	460972	3.421477	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328240	460972	2.852763	0.000097	0	0	0	1-HR	ALL	1ST	UCAR T1	18042417
328340	460972	3.218742	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328440	460972	2.688098	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328540	460972	2.513606	0.0001	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622

324540	461072	2.583947	0.000088	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324640	461072	2.645089	0.000109	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324740	461072	2.472379	0.00009	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324840	461072	2.704681	0.000112	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
324940	461072	2.866955	0.000116	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325040	461072	2.689177	0.000081	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325140	461072	2.76288	0.000085	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325240	461072	2.590451	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325340	461072	3.198165	0.000104	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325440	461072	2.962379	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325540	461072	3.321823	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325640	461072	3.365326	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325740	461072	2.411346	0.000286	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325840	461072	3.197154	0.000193	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
325940	461072	3.328123	0.00012	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
326040	461072	3.366931	0.000328	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326140	461072	3.444148	0.000216	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616

326240	461072	3.644026	0.000309	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326340	461072	3.643019	0.000232	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	461072	3.516124	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	461072	3.27887	0.000077	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461072	3.455873	0.000271	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461072	3.156096	0.000187	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	461072	1.152107	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
326940	461072	2.950105	0.000316	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327040	461072	1.755145	0.00031	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327140	461072	3.101262	0.000357	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327240	461072	3.440199	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327340	461072	3.693376	0.000162	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327440	461072	1.965361	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327540	461072	3.014321	0.000184	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327640	461072	3.070119	0.000112	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
327740	461072	2.989758	0.000162	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327840	461072	2.798973	0.000191	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316

327940	461072	3.457357	0.00019	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328040	461072	3.50206	0.000123	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328140	461072	2.985164	0.0001	0	0	0	1-HR	ALL	1ST	UCAR T1	18042417
328240	461072	3.238437	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328340	461072	2.719699	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328440	461072	2.489054	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328540	461072	2.692771	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
324540	461172	2.794312	0.000103	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724
324640	461172	2.721636	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724
324740	461172	2.674596	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324840	461172	2.57506	0.000108	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324940	461172	2.653719	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325040	461172	3.031578	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325140	461172	2.721107	0.000093	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325240	461172	2.900208	0.000091	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325340	461172	2.638842	0.00012	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325440	461172	3.29132	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713

325540	461172	3.093714	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325640	461172	3.662158	0.000135	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325740	461172	3.161389	0.000213	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325840	461172	3.272087	0.000288	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325940	461172	2.914746	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
326040	461172	3.503338	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326140	461172	3.847743	0.000355	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326240	461172	3.722878	0.000331	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326340	461172	3.633456	0.000234	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	461172	3.789207	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326540	461172	3.424681	0.000084	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461172	3.466598	0.00031	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461172	2.994152	0.000163	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	461172	1.502837	0.000197	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
326940	461172	2.934707	0.000338	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
327040	461172	1.886292	0.000378	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327140	461172	3.395402	0.000337	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522

327240	461172	4.213359	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327340	461172	2.776202	0.000236	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327440	461172	2.778081	0.00023	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327540	461172	3.277369	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327640	461172	3.080646	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327740	461172	2.845496	0.000206	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327840	461172	3.561634	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327940	461172	3.560719	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
328040	461172	3.147541	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328140	461172	3.183592	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328240	461172	2.747014	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328340	461172	2.624304	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328440	461172	2.964987	0.000089	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328540	461172	2.988114	0.000108	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
324540	461272	2.663327	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
324640	461272	2.686706	0.000119	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
324740	461272	2.936069	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724

324840	461272	2.714649	0.000109	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
324940	461272	2.713992	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325040	461272	2.51912	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325140	461272	3.157534	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325240	461272	2.716982	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325340	461272	3.033793	0.000097	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325440	461272	2.702049	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325540	461272	3.313683	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325640	461272	3.079727	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325740	461272	3.709397	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
325840	461272	2.51044	0.000327	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325940	461272	3.689148	0.00023	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
326040	461272	3.852586	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18031217
326140	461272	3.639492	0.000449	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326240	461272	3.410879	0.000301	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326340	461272	3.386047	0.000221	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326440	461272	4.015753	0.000187	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922

326540	461272	3.557938	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461272	3.41245	0.000353	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461272	2.686232	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326840	461272	2.046977	0.000289	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326940	461272	2.449942	0.000368	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327040	461272	2.910581	0.000479	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327140	461272	3.790621	0.00028	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327240	461272	3.709466	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327340	461272	2.247166	0.000274	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327440	461272	3.307734	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327540	461272	3.095057	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327640	461272	3.049309	0.000227	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327740	461272	3.646716	0.00023	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327840	461272	3.585992	0.00014	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327940	461272	3.271646	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328040	461272	3.031948	0.000147	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328140	461272	2.706537	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622

328240	461272	2.943103	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328340	461272	3.155661	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
328440	461272	3.049507	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
328540	461272	2.68805	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18091621
324540	461372	2.848412	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
324640	461372	2.901839	0.00012	0	0	0	1-HR	ALL	1ST	UCAR T1	18030515
324740	461372	2.719045	0.00014	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
324840	461372	2.933886	0.000119	0	0	0	1-HR	ALL	1ST	UCAR T1	18022723
324940	461372	2.866593	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724
325040	461372	2.839334	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325140	461372	2.626143	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325240	461372	3.215836	0.000155	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325340	461372	2.965529	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325440	461372	3.155288	0.000105	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325540	461372	2.791993	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325640	461372	3.22678	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325740	461372	3.138116	0.000184	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713

325840	461372	3.78388	0.00018	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
325940	461372	3.561635	0.000375	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326040	461372	3.15762	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
326140	461372	3.94921	0.000398	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326240	461372	3.519882	0.00024	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326340	461372	3.713269	0.000308	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326440	461372	4.144018	0.000233	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326540	461372	3.665267	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461372	3.446556	0.000402	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461372	2.221158	0.00011	0	0	0	1-HR	ALL	1ST	UCAR T1	18021521
326840	461372	2.515742	0.000409	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326940	461372	1.584086	0.000417	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
327040	461372	3.474876	0.000434	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327140	461372	4.637367	0.000177	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327240	461372	2.146378	0.000306	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327340	461372	3.184012	0.000237	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327440	461372	2.988932	0.000153	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315

327540	461372	3.317478	0.000254	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327640	461372	3.700332	0.000256	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327740	461372	3.562322	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327840	461372	3.330477	0.000152	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
327940	461372	3.031525	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
328040	461372	2.735686	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328140	461372	3.297636	0.000112	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328240	461372	3.41236	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
328340	461372	2.87434	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18091621
328440	461372	2.798098	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328540	461372	2.708064	0.000174	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
324540	461472	2.684232	0.000108	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
324640	461472	2.787034	0.000163	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
324740	461472	2.995289	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
324840	461472	2.902575	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
324940	461472	2.708144	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325040	461472	3.06109	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724

325140	461472	2.856639	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325240	461472	3.006451	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325340	461472	3.167422	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325440	461472	3.233434	0.000147	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325540	461472	3.346395	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325640	461472	2.988235	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325740	461472	3.272253	0.000199	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325840	461472	3.566615	0.000199	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325940	461472	3.260438	0.000347	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326040	461472	4.226637	0.000282	0	0	0	1-HR	ALL	1ST	UCAR T1	18012416
326140	461472	4.284941	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326240	461472	4.027754	0.000465	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326340	461472	4.295935	0.000434	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326440	461472	4.098524	0.000292	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326540	461472	3.726227	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461472	3.686826	0.000451	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461472	1.625956	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18022415

326840	461472	2.61544	0.000492	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326940	461472	2.322212	0.000604	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327040	461472	4.070664	0.000367	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327140	461472	3.576185	0.000305	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327240	461472	2.853878	0.000311	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327340	461472	2.983339	0.000163	0	0	0	1-HR	ALL	1ST	UCAR T1	18120315
327440	461472	3.57084	0.000283	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327540	461472	3.7051	0.000286	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327640	461472	3.469197	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327740	461472	3.287827	0.000174	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
327840	461472	3.088521	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
327940	461472	3.116235	0.000155	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
328040	461472	3.605968	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
328140	461472	3.3999	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
328240	461472	2.897364	0.000189	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328340	461472	2.833632	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328440	461472	2.759771	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920

328540	461472	2.77564	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
324540	461572	2.690535	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18032016
324640	461572	2.718339	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18032016
324740	461572	2.734883	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
324840	461572	2.846963	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
324940	461572	3.094227	0.000177	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325040	461572	2.916759	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325140	461572	2.924023	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325240	461572	2.927548	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724
325340	461572	3.297885	0.00017	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325440	461572	3.076447	0.000174	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325540	461572	3.48404	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325640	461572	3.561589	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325740	461572	3.330626	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18031323
325840	461572	3.150491	0.000234	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325940	461572	3.8707	0.00021	0	0	0	1-HR	ALL	1ST	UCAR T1	18021524
326040	461572	3.637961	0.00049	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613

326140	461572	3.62532	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
326240	461572	3.847577	0.000618	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326340	461572	4.350426	0.000512	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326440	461572	3.78429	0.000361	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326540	461572	3.710363	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461572	3.817105	0.000494	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461572	1.773742	0.000239	0	0	0	1-HR	ALL	1ST	UCAR T1	18100221
326840	461572	1.997952	0.000516	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
326940	461572	3.201877	0.00059	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
327040	461572	4.887821	0.000257	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327140	461572	2.058375	0.000385	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327240	461572	3.09199	0.00021	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327340	461572	3.766795	0.000312	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327440	461572	3.63704	0.000323	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327540	461572	3.39112	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327640	461572	3.140613	0.000196	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
327740	461572	2.968089	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207

327840	461572	3.568068	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
327940	461572	3.865658	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
328040	461572	3.009704	0.000204	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328140	461572	2.916022	0.000232	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328240	461572	2.968505	0.000205	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328340	461572	2.883295	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328440	461572	2.843538	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18092816
328540	461572	3.061829	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
324540	461672	2.830783	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
324640	461672	2.954643	0.000174	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
324740	461672	2.708458	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18032016
324840	461672	2.724666	0.000164	0	0	0	1-HR	ALL	1ST	UCAR T1	18032016
324940	461672	2.732386	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325040	461672	2.845549	0.000214	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325140	461672	3.09979	0.000185	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325240	461672	2.816048	0.000191	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325340	461672	2.979961	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724

325440	461672	3.41964	0.000184	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325540	461672	3.405598	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325640	461672	3.671114	0.000208	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325740	461672	3.78706	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325840	461672	3.670762	0.000202	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
325940	461672	2.751283	0.000273	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326040	461672	3.788665	0.000307	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326140	461672	4.66472	0.000364	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326240	461672	4.217489	0.000465	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326340	461672	3.493022	0.000448	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326440	461672	3.117609	0.000427	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326540	461672	3.574249	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18092804
326640	461672	3.732817	0.000515	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461672	2.099989	0.000457	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326840	461672	2.118608	0.000627	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
326940	461672	4.075929	0.000505	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
327040	461672	2.913743	0.000428	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124

327140	461672	2.821286	0.000311	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327240	461672	3.82797	0.000337	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327340	461672	3.464609	0.000367	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327440	461672	3.344396	0.000183	0	0	0	1-HR	ALL	1ST	UCAR T1	18042417
327540	461672	3.02298	0.000217	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
327640	461672	3.356402	0.000196	0	0	0	1-HR	ALL	1ST	UCAR T1	18091622
327740	461672	4.038115	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
327840	461672	3.654976	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327940	461672	3.033879	0.000267	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328040	461672	3.157748	0.000245	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328140	461672	3.069765	0.000176	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328240	461672	2.984938	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
328340	461672	3.38978	0.000168	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
328440	461672	3.433354	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
328540	461672	3.095964	0.000123	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
324540	461772	2.713112	0.000116	0	0	0	1-HR	ALL	1ST	UCAR T1	18021602
324640	461772	2.634636	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201

324740	461772	2.83799	0.00018	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
324840	461772	3.161442	0.000203	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
324940	461772	3.037539	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325040	461772	2.663762	0.000194	0	0	0	1-HR	ALL	1ST	UCAR T1	18032016
325140	461772	2.66893	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325240	461772	2.742472	0.000248	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325340	461772	2.941234	0.00019	0	0	0	1-HR	ALL	1ST	UCAR T1	18030515
325440	461772	2.583555	0.000205	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325540	461772	3.539024	0.00017	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325640	461772	3.795032	0.000199	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325740	461772	4.021125	0.000247	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325840	461772	4.198095	0.000153	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
325940	461772	3.940774	0.000253	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326040	461772	2.590769	0.000313	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326140	461772	3.121989	0.000619	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326240	461772	3.839298	0.000245	0	0	0	1-HR	ALL	1ST	UCAR T1	18031218
326340	461772	3.321372	0.000632	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616

326440	461772	2.61677	0.000458	0	0	0	1-HR	ALL	1ST	UCAR T1	18111219
326540	461772	3.261298	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18022018
326640	461772	3.296334	0.00049	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461772	2.518481	0.000742	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326840	461772	2.4835	0.000946	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
326940	461772	4.56848	0.000391	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327040	461772	2.162464	0.000447	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327140	461772	3.627039	0.000347	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327240	461772	3.149864	0.000423	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327340	461772	3.182683	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18092815
327440	461772	2.973755	0.00025	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327540	461772	3.912761	0.000217	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327640	461772	4.193425	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18052614
327740	461772	2.989057	0.000305	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327840	461772	3.284084	0.000297	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327940	461772	3.230536	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
328040	461772	3.167109	0.000185	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617

328140	461772	3.700119	0.000188	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
328240	461772	3.55947	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
328340	461772	3.259976	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
328440	461772	3.097177	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
328540	461772	3.114778	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18091620
324540	461872	3.344624	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324640	461872	3.002905	0.000106	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324740	461872	2.821874	0.000118	0	0	0	1-HR	ALL	1ST	UCAR T1	18021602
324840	461872	2.733716	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
324940	461872	2.636164	0.000188	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325040	461872	3.214793	0.000231	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325140	461872	3.310118	0.000244	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325240	461872	2.70474	0.000231	0	0	0	1-HR	ALL	1ST	UCAR T1	18032016
325340	461872	2.487811	0.000182	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325440	461872	2.6163	0.000291	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325540	461872	2.667243	0.000236	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325640	461872	3.090224	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18022724

325740	461872	3.855019	0.000253	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325840	461872	4.272326	0.00029	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
325940	461872	4.629821	0.000171	0	0	0	1-HR	ALL	1ST	UCAR T1	18021517
326040	461872	3.992485	0.000322	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326140	461872	3.003901	0.000344	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326240	461872	4.519109	0.000562	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326340	461872	3.923413	0.000917	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326440	461872	3.238281	0.000573	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326540	461872	3.142279	0.000205	0	0	0	1-HR	ALL	1ST	UCAR T1	18022018
326640	461872	2.860914	0.000388	0	0	0	1-HR	ALL	1ST	UCAR T1	18102614
326740	461872	2.780521	0.000791	0	0	0	1-HR	ALL	1ST	UCAR T1	18031601
326840	461872	3.361482	0.000745	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
326940	461872	2.632181	0.000591	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327040	461872	2.996062	0.000323	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
327140	461872	2.849766	0.000496	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327240	461872	2.786772	0.000272	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327340	461872	3.147803	0.000304	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207

327440	461872	4.224723	0.000231	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327540	461872	3.490216	0.000341	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327640	461872	3.264186	0.000365	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327740	461872	3.518529	0.00026	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327840	461872	3.489378	0.000225	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
327940	461872	3.92017	0.000206	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
328040	461872	3.54847	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
328140	461872	3.396024	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
328240	461872	3.386578	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18091620
328340	461872	3.226554	0.000143	0	0	0	1-HR	ALL	1ST	UCAR T1	18112123
328440	461872	2.984058	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18112123
328540	461872	2.793527	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18112123
324540	461972	3.340764	0.000158	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324640	461972	3.805896	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324740	461972	4.10357	0.000168	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324840	461972	4.118979	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324940	461972	3.765362	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014

325040	461972	3.043534	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18021602
325140	461972	2.5881	0.000185	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325240	461972	2.965706	0.000253	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325340	461972	3.392681	0.000297	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325440	461972	2.929884	0.000279	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325540	461972	2.045483	0.000215	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325640	461972	2.2378	0.000344	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325740	461972	2.114096	0.000293	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802
325840	461972	3.924663	0.000257	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
325940	461972	4.086389	0.000323	0	0	0	1-HR	ALL	1ST	UCAR T1	18111220
326040	461972	4.910912	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18021313
326140	461972	3.549144	0.000416	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326240	461972	3.231884	0.000644	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326340	461972	3.684668	0.00044	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326440	461972	3.378798	0.000941	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326540	461972	3.553858	0.000254	0	0	0	1-HR	ALL	1ST	UCAR T1	18022018
326640	461972	3.427309	0.00029	0	0	0	1-HR	ALL	1ST	UCAR T1	18022415

326740	461972	3.341483	0.001349	0	0	0	1-HR	ALL	1ST	UCAR T1	18031524
326840	461972	3.329937	0.000637	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
326940	461972	2.933391	0.000406	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
327040	461972	3.290567	0.000594	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327140	461972	2.561495	0.000366	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327240	461972	3.734697	0.00036	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327340	461972	3.949731	0.000361	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327440	461972	2.952322	0.000455	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327540	461972	3.832369	0.000327	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327640	461972	3.818492	0.000278	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
327740	461972	3.905491	0.000215	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
327840	461972	3.839175	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
327940	461972	3.564249	0.000167	1.4	1.4	0	1-HR	ALL	1ST	UCAR T1	18091620
328040	461972	3.406662	0.000175	2.9	2.9	0	1-HR	ALL	1ST	UCAR T1	18112123
328140	461972	3.129019	0.000195	3.6	3.6	0	1-HR	ALL	1ST	UCAR T1	18112123
328240	461972	3.068521	0.000176	1.1	1.1	0	1-HR	ALL	1ST	UCAR T1	18112123
328340	461972	2.992918	0.000182	0	0	0	1-HR	ALL	1ST	UCAR T1	18111214

328440	461972	3.092727	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18111214
328540	461972	3.047072	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18072401
324540	462072	2.636984	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18021217
324640	462072	2.823361	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324740	462072	2.903968	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324840	462072	3.304621	0.000183	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
324940	462072	4.069228	0.000204	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325040	462072	4.711291	0.000217	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325140	462072	5.00717	0.000216	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325240	462072	4.721908	0.000198	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325340	462072	3.762135	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18021602
325440	462072	2.356123	0.000258	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325540	462072	3.041605	0.000351	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325640	462072	2.907461	0.000371	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325740	462072	2.169478	0.000269	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325840	462072	2.495052	0.000403	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
325940	462072	2.786724	0.000302	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802

326040	462072	4.061162	0.000328	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
326140	462072	4.713165	0.000279	0	0	0	1-HR	ALL	1ST	UCAR T1	18110706
326240	462072	4.17751	0.000543	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326340	462072	3.517662	0.000989	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326440	462072	4.204208	0.000861	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326540	462072	3.804537	0.000325	0	0	0	1-HR	ALL	1ST	UCAR T1	18022018
326640	462072	3.805752	0.000841	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326740	462072	4.080314	0.001265	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
326840	462072	3.243478	0.000712	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
326940	462072	3.684804	0.000733	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
327040	462072	3.302907	0.000509	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327140	462072	3.865585	0.000396	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
327240	462072	3.092219	0.000576	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327340	462072	3.922883	0.000425	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327440	462072	4.415851	0.000346	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
327540	462072	4.171352	0.000252	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
327640	462072	4.204324	0.000217	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217

327740	462072	3.628047	0.000224	0.9	0.9	0	1-HR	ALL	1ST	UCAR T1	18052616
327840	462072	3.405902	0.000242	1.8	1.8	0	1-HR	ALL	1ST	UCAR T1	18052616
327940	462072	3.412619	0.000222	2.8	2.8	0	1-HR	ALL	1ST	UCAR T1	18111214
328040	462072	3.424001	0.000223	4.2	4.2	0	1-HR	ALL	1ST	UCAR T1	18111214
328140	462072	3.425182	0.000183	4.6	4.6	0	1-HR	ALL	1ST	UCAR T1	18072401
328240	462072	3.339065	0.000143	2.6	2.6	0	1-HR	ALL	1ST	UCAR T1	18072401
328340	462072	3.382671	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18111215
328440	462072	3.243653	0.000163	0	0	0	1-HR	ALL	1ST	UCAR T1	18111215
328540	462072	2.999015	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18111215
324540	462172	2.214796	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324640	462172	2.42424	0.000119	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324740	462172	2.594191	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324840	462172	2.693795	0.00011	0	0	0	1-HR	ALL	1ST	UCAR T1	18021217
324940	462172	2.687041	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18021217
325040	462172	2.698836	0.000158	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325140	462172	2.856463	0.000198	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325240	462172	3.736187	0.000239	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014

325340	462172	4.836926	0.000275	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325440	462172	5.657038	0.000296	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325540	462172	5.647141	0.000287	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325640	462172	4.391776	0.000241	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325740	462172	2.500739	0.000386	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325840	462172	2.899909	0.000497	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
325940	462172	2.920056	0.000395	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
326040	462172	3.253273	0.000443	0	0	0	1-HR	ALL	1ST	UCAR T1	18102617
326140	462172	3.709492	0.000455	0	0	0	1-HR	ALL	1ST	UCAR T1	18030514
326240	462172	4.44481	0.000421	0	0	0	1-HR	ALL	1ST	UCAR T1	18110706
326340	462172	4.574135	0.000699	0	0	0	1-HR	ALL	1ST	UCAR T1	18112713
326440	462172	4.851716	0.001499	0	0	0	1-HR	ALL	1ST	UCAR T1	18102616
326540	462172	4.045455	0.000462	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326640	462172	4.418003	0.001804	0	0	0	1-HR	ALL	1ST	UCAR T1	18031523
326740	462172	4.063817	0.001113	0	0	0	1-HR	ALL	1ST	UCAR T1	18112124
326840	462172	3.943677	0.000952	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
326940	462172	4.161894	0.000717	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207

327040	462172	4.466715	0.000721	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327140	462172	4.004594	0.000582	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327240	462172	4.728301	0.000417	0	0	0	1-HR	ALL	1ST	UCAR T1	18052617
327340	462172	4.469405	0.00032	0	0	0	1-HR	ALL	1ST	UCAR T1	18111217
327440	462172	4.440748	0.000305	0	0	0	1-HR	ALL	1ST	UCAR T1	18052616
327540	462172	4.09277	0.00031	0	0	0	1-HR	ALL	1ST	UCAR T1	18052616
327640	462172	3.967098	0.000303	0.4	0.4	0	1-HR	ALL	1ST	UCAR T1	18111214
327740	462172	4.115429	0.000243	2	2	0	1-HR	ALL	1ST	UCAR T1	18111214
327840	462172	3.98929	0.000191	2.9	2.9	0	1-HR	ALL	1ST	UCAR T1	18052619
327940	462172	3.954134	0.00022	3.6	3.6	0	1-HR	ALL	1ST	UCAR T1	18111215
328040	462172	3.644489	0.000223	4	4	0	1-HR	ALL	1ST	UCAR T1	18111215
328140	462172	3.36928	0.000203	3.3	3.3	0	1-HR	ALL	1ST	UCAR T1	18111215
328240	462172	3.405078	0.000181	2.1	2.1	0	1-HR	ALL	1ST	UCAR T1	18072324
328340	462172	3.476626	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18072324
328440	462172	3.398694	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18072324
328540	462172	3.304466	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18072402
324540	462272	3.043054	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716

324640	462272	2.922095	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324740	462272	2.911094	0.000183	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324840	462272	2.918863	0.000193	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324940	462272	2.86446	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325040	462272	2.731706	0.000207	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325140	462272	2.506535	0.000208	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325240	462272	2.182028	0.000204	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325340	462272	2.039593	0.000193	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325440	462272	2.196988	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325540	462272	2.236686	0.000248	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325640	462272	3.461634	0.000326	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325740	462272	4.789024	0.000402	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325840	462272	5.33593	0.000441	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
325940	462272	3.907814	0.000396	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
326040	462272	3.854292	0.000643	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
326140	462272	4.18353	0.000642	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
326240	462272	4.055788	0.000606	0	0	0	1-HR	ALL	1ST	UCAR T1	18022802

326340	462272	4.870343	0.000712	0	0	0	1-HR	ALL	1ST	UCAR T1	18110706
326440	462272	4.577863	0.001839	0	0	0	1-HR	ALL	1ST	UCAR T1	18102613
326540	462272	4.583194	0.000782	0	0	0	1-HR	ALL	1ST	UCAR T1	18032922
326640	462272	4.416533	0.002891	0	0	0	1-HR	ALL	1ST	UCAR T1	18031522
326740	462272	4.758894	0.001348	0	0	0	1-HR	ALL	1ST	UCAR T1	18120316
326840	462272	5.080186	0.00091	0	0	0	1-HR	ALL	1ST	UCAR T1	18100207
326940	462272	4.773983	0.000876	0	0	0	1-HR	ALL	1ST	UCAR T1	18032920
327040	462272	4.77884	0.000514	0	0	0	1-HR	ALL	1ST	UCAR T1	18110707
327140	462272	4.561237	0.000464	0	0	0	1-HR	ALL	1ST	UCAR T1	18052616
327240	462272	5.087409	0.000447	0	0	0	1-HR	ALL	1ST	UCAR T1	18111214
327340	462272	5.985767	0.000359	0	0	0	1-HR	ALL	1ST	UCAR T1	18111214
327440	462272	5.408536	0.000323	0	0	0	1-HR	ALL	1ST	UCAR T1	18111215
327540	462272	4.642225	0.000336	0	0	0	1-HR	ALL	1ST	UCAR T1	18111215
327640	462272	4.723612	0.000282	0.1	0.1	0	1-HR	ALL	1ST	UCAR T1	18111215
327740	462272	4.494041	0.000243	0.9	0.9	0	1-HR	ALL	1ST	UCAR T1	18072324
327840	462272	4.503998	0.000202	2.5	2.5	0	1-HR	ALL	1ST	UCAR T1	18072324
327940	462272	4.325898	0.000175	3.1	3.1	0	1-HR	ALL	1ST	UCAR T1	18072402

328040	462272	4.023371	0.00015	3.9	3.9	0	1-HR	ALL	1ST	UCAR T1	18072402
328140	462272	3.66432	0.000131	3.9	3.9	0	1-HR	ALL	1ST	UCAR T1	18111213
328240	462272	3.36074	0.000128	1.1	1.1	0	1-HR	ALL	1ST	UCAR T1	18103113
328340	462272	3.299287	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18103113
328440	462272	3.181022	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18103113
328540	462272	3.071959	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18091618
324540	462372	2.982954	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18112717
324640	462372	3.088388	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18112717
324740	462372	3.18814	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18112717
324840	462372	3.272281	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
324940	462372	3.33335	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325040	462372	3.361783	0.00017	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325140	462372	3.345641	0.000193	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325240	462372	3.270585	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325340	462372	3.1203	0.00025	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325440	462372	2.872859	0.000285	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325540	462372	2.474883	0.000322	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716

325640	462372	2.005443	0.000361	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325740	462372	2.307391	0.000398	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325840	462372	3.018657	0.000425	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
325940	462372	3.938256	0.000427	0	0	0	1-HR	ALL	1ST	UCAR T1	18112716
326040	462372	4.482422	0.000469	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
326140	462372	3.884885	0.0007	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
326240	462372	4.219656	0.000808	0	0	0	1-HR	ALL	1ST	UCAR T1	18093014
326340	462372	4.582338	0.001266	0	0	0	1-HR	ALL	1ST	UCAR T1	18112201
326440	462372	4.842688	0.001564	0	0	0	1-HR	ALL	1ST	UCAR T1	18110706
326540	462372	5.131419	0.002332	0	0	0	1-HR	ALL	1ST	UCAR T1	18012415
326640	462372	4.035594	0.002342	0	0	0	1-HR	ALL	1ST	UCAR T1	18111218
326740	462372	4.835029	0.001715	0	0	0	1-HR	ALL	1ST	UCAR T1	18012413
326840	462372	4.858757	0.000997	0	0	0	1-HR	ALL	1ST	UCAR T1	18110707
326940	462372	5.546797	0.000662	0	0	0	1-HR	ALL	1ST	UCAR T1	18111214
327040	462372	6.081552	0.000647	0	0	0	1-HR	ALL	1ST	UCAR T1	18111215
327140	462372	7.069239	0.000445	0	0	0	1-HR	ALL	1ST	UCAR T1	18072324
327240	462372	6.315023	0.000332	0	0	0	1-HR	ALL	1ST	UCAR T1	18072402

327340	462372	5.068295	0.000266	0	0	0	1-HR	ALL	1ST	UCAR T1	18103113
327440	462372	4.868949	0.000273	0	0	0	1-HR	ALL	1ST	UCAR T1	18103113
327540	462372	4.734964	0.000282	0	0	0	1-HR	ALL	1ST	UCAR T1	18091618
327640	462372	4.448644	0.000281	0	0	0	1-HR	ALL	1ST	UCAR T1	18091618
327740	462372	4.155166	0.000272	0	0	0	1-HR	ALL	1ST	UCAR T1	18091618
327840	462372	3.870409	0.000256	0.8	0.8	0	1-HR	ALL	1ST	UCAR T1	18091618
327940	462372	3.584017	0.000239	2.6	2.6	0	1-HR	ALL	1ST	UCAR T1	18091618
328040	462372	3.355362	0.00022	3.1	3.1	0	1-HR	ALL	1ST	UCAR T1	18091618
328140	462372	3.279608	0.000205	1.3	1.3	0	1-HR	ALL	1ST	UCAR T1	18072323
328240	462372	3.17442	0.000194	0.1	0.1	0	1-HR	ALL	1ST	UCAR T1	18072323
328340	462372	3.077933	0.000184	0	0	0	1-HR	ALL	1ST	UCAR T1	18072323
328440	462372	2.974815	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18072323
328540	462372	2.973436	0.000164	0	0	0	1-HR	ALL	1ST	UCAR T1	18072323
324540	462472	2.764179	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
324640	462472	2.808682	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
324740	462472	2.844216	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
324840	462472	2.867735	0.000156	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815

324940	462472	2.875446	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325040	462472	2.862684	0.000174	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325140	462472	2.823828	0.000185	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325240	462472	2.752191	0.000198	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325340	462472	2.640128	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325440	462472	2.449177	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325540	462472	2.169639	0.000248	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325640	462472	2.406482	0.000271	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325740	462472	2.676701	0.000298	0	0	0	1-HR	ALL	1ST	UCAR T1	18112815
325840	462472	2.977405	0.00034	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
325940	462472	3.264995	0.000408	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
326040	462472	3.723298	0.0005	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
326140	462472	4.100132	0.000631	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
326240	462472	3.946906	0.000829	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
326340	462472	4.559498	0.001161	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
326440	462472	3.921722	0.001818	0	0	0	1-HR	ALL	1ST	UCAR T1	18122415
326540	462472	3.732847	0.007539	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713

326640	462472	5.528082	0.001625	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
326740	462472	5.000104	0.001283	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
326840	462472	4.444643	0.000983	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
326940	462472	4.939846	0.000785	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327040	462472	4.814872	0.000651	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327140	462472	5.130539	0.000556	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327240	462472	5.755276	0.000484	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327340	462472	5.962652	0.000428	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327440	462472	5.909024	0.000383	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327540	462472	5.708774	0.000346	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327640	462472	5.435294	0.000315	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
327740	462472	5.122469	0.000289	1.3	1.3	0	1-HR	ALL	1ST	UCAR T1	18091617
327840	462472	4.808324	0.000267	4.1	4.1	0	1-HR	ALL	1ST	UCAR T1	18091617
327940	462472	4.520398	0.000247	4.2	4.2	0	1-HR	ALL	1ST	UCAR T1	18091617
328040	462472	4.251132	0.00023	2.2	2.2	0	1-HR	ALL	1ST	UCAR T1	18091617
328140	462472	3.995771	0.000215	1	1	0	1-HR	ALL	1ST	UCAR T1	18091617
328240	462472	3.758198	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617

328340	462472	3.541955	0.000189	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
328440	462472	3.377733	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
328540	462472	3.270391	0.000168	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
324540	462572	2.705104	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18021216
324640	462572	2.693824	0.000143	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
324740	462572	2.658228	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
324840	462572	2.656276	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
324940	462572	2.622587	0.000188	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
325040	462572	2.547635	0.000207	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
325140	462572	2.42244	0.000226	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
325240	462572	2.204273	0.000246	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
325340	462572	1.895047	0.000266	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
325440	462572	1.867771	0.000286	0	0	0	1-HR	ALL	1ST	UCAR T1	18021614
325540	462572	1.983431	0.000328	0	0	0	1-HR	ALL	1ST	UCAR T1	18112814
325640	462572	2.088949	0.000372	0	0	0	1-HR	ALL	1ST	UCAR T1	18112814
325740	462572	2.258765	0.000421	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
325840	462572	2.686205	0.000472	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017

325940	462572	3.090029	0.000437	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
326040	462572	3.295234	0.000469	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
326140	462572	4.263426	0.000639	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
326240	462572	4.649659	0.001356	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
326340	462572	4.516643	0.001195	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
326440	462572	5.24172	0.001484	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
326540	462572	4.070873	0.0015	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326640	462572	4.469814	0.001948	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
326740	462572	4.892218	0.001869	0	0	0	1-HR	ALL	1ST	UCAR T1	18120317
326840	462572	6.697343	0.000908	0.2	0.2	0	1-HR	ALL	1ST	UCAR T1	18072321
326940	462572	6.780694	0.000593	0.1	0.1	0	1-HR	ALL	1ST	UCAR T1	18101322
327040	462572	6.768516	0.000413	0	0	0	1-HR	ALL	1ST	UCAR T1	18043016
327140	462572	6.966066	0.000368	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
327240	462572	6.595	0.000425	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
327340	462572	6.992382	0.000395	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
327440	462572	7.130035	0.000326	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
327540	462572	6.671031	0.000251	0.1	0.1	0	1-HR	ALL	1ST	UCAR T1	18091616

327640	462572	5.949005	0.00021	0.4	0.4	0	1-HR	ALL	1ST	UCAR T1	18092801
327740	462572	5.143089	0.000185	2.9	2.9	0	1-HR	ALL	1ST	UCAR T1	18092801
327840	462572	4.393305	0.000163	4.2	4.2	0	1-HR	ALL	1ST	UCAR T1	18092801
327940	462572	3.768736	0.000142	3.9	3.9	0	1-HR	ALL	1ST	UCAR T1	18092801
328040	462572	3.580367	0.000129	0.7	0.7	0	1-HR	ALL	1ST	UCAR T1	18090315
328140	462572	3.379588	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
328240	462572	3.430662	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
328340	462572	3.442945	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
328440	462572	3.425516	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
328540	462572	3.385836	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18091617
324540	462672	2.620288	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18112814
324640	462672	2.662515	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18112814
324740	462672	2.719931	0.000187	0	0	0	1-HR	ALL	1ST	UCAR T1	18112814
324840	462672	2.767451	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18112814
324940	462672	2.878866	0.000213	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
325040	462672	2.980989	0.000237	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
325140	462672	3.142298	0.000251	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017

325240	462672	3.179576	0.000251	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
325340	462672	3.200913	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
325440	462672	3.671011	0.000243	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325540	462672	3.934884	0.000263	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325640	462672	4.26626	0.000261	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325740	462672	3.834303	0.000344	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325840	462672	2.569514	0.00042	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325940	462672	2.968015	0.000658	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
326040	462672	3.235082	0.000942	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
326140	462672	3.422061	0.000575	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
326240	462672	4.377388	0.000792	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
326340	462672	4.794134	0.000834	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
326440	462672	4.608256	0.001893	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326540	462672	4.734972	0.000572	0	0	0	1-HR	ALL	1ST	UCAR T1	18021717
326640	462672	4.768121	0.001598	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
326740	462672	4.566768	0.001467	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
326840	462672	5.328331	0.001034	1.6	1.6	0	1-HR	ALL	1ST	UCAR T1	18120317

326940	462672	5.051786	0.000918	1	1	0	1-HR	ALL	1ST	UCAR T1	18120317
327040	462672	7.606278	0.000534	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
327140	462672	6.329495	0.000487	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
327240	462672	6.314084	0.000364	0.2	0.2	0	1-HR	ALL	1ST	UCAR T1	18101322
327340	462672	6.151892	0.000299	0.3	0.3	0	1-HR	ALL	1ST	UCAR T1	18051422
327440	462672	6.273721	0.000219	0.8	0.8	0	1-HR	ALL	1ST	UCAR T1	18043016
327540	462672	5.533336	0.000214	1.5	1.5	0	1-HR	ALL	1ST	UCAR T1	18043016
327640	462672	5.37529	0.000178	3.2	3.2	0	1-HR	ALL	1ST	UCAR T1	18072221
327740	462672	4.770198	0.000202	5.9	5.9	0	1-HR	ALL	1ST	UCAR T1	18091616
327840	462672	4.108427	0.000226	5.8	5.8	0	1-HR	ALL	1ST	UCAR T1	18091616
327940	462672	4.324084	0.000232	3.7	3.7	0	1-HR	ALL	1ST	UCAR T1	18091616
328040	462672	4.344884	0.000222	1.8	1.8	0	1-HR	ALL	1ST	UCAR T1	18091616
328140	462672	4.203992	0.000202	0.1	0.1	0	1-HR	ALL	1ST	UCAR T1	18091616
328240	462672	3.9879	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
328340	462672	3.863561	0.000152	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
328440	462672	3.680959	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18051423
328540	462672	3.463791	0.00012	0	0	0	1-HR	ALL	1ST	UCAR T1	18051423

324540	462772	2.83874	0.000168	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
324640	462772	2.915943	0.000163	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
324740	462772	2.914341	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18032017
324840	462772	3.251727	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
324940	462772	3.674378	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325040	462772	3.969907	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325140	462772	4.029493	0.000182	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325240	462772	3.780485	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
325340	462772	3.646984	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325440	462772	3.434293	0.000279	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325540	462772	3.258582	0.000297	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325640	462772	3.065706	0.000406	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325740	462772	2.998624	0.00062	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325840	462772	2.647702	0.000537	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325940	462772	2.668368	0.000406	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
326040	462772	3.341947	0.000752	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
326140	462772	3.401801	0.000584	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619

326240	462772	3.844637	0.000561	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
326340	462772	4.321843	0.001387	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
326440	462772	4.129967	0.000475	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326540	462772	4.363102	0.000492	0	0	0	1-HR	ALL	1ST	UCAR T1	18021717
326640	462772	4.304239	0.000632	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
326740	462772	4.910583	0.001089	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
326840	462772	4.457739	0.001029	0.7	0.7	0	1-HR	ALL	1ST	UCAR T1	18030518
326940	462772	4.731296	0.000534	1	1	0	1-HR	ALL	1ST	UCAR T1	18120317
327040	462772	7.348092	0.000715	0.5	0.5	0	1-HR	ALL	1ST	UCAR T1	18120317
327140	462772	7.037253	0.000542	0.6	0.6	0	1-HR	ALL	1ST	UCAR T1	18120317
327240	462772	6.180103	0.000329	1.3	1.3	0	1-HR	ALL	1ST	UCAR T1	18072321
327340	462772	5.658435	0.000397	1.8	1.8	0	1-HR	ALL	1ST	UCAR T1	18072321
327440	462772	4.930556	0.00032	2.5	2.5	0	1-HR	ALL	1ST	UCAR T1	18072321
327540	462772	4.841935	0.000237	1.3	1.3	0	1-HR	ALL	1ST	UCAR T1	18101322
327640	462772	4.752861	0.000255	1.1	1.1	0	1-HR	ALL	1ST	UCAR T1	18101322
327740	462772	5.286693	0.000207	3.3	3.3	0	1-HR	ALL	1ST	UCAR T1	18051422
327840	462772	5.074227	0.000158	5.2	5.2	0	1-HR	ALL	1ST	UCAR T1	18051422

327940	462772	4.398714	0.000153	4.1	4.1	0	1-HR	ALL	1ST	UCAR T1	18043016
328040	462772	3.718727	0.000144	0.5	0.5	0	1-HR	ALL	1ST	UCAR T1	18043016
328140	462772	3.573819	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18072221
328240	462772	3.293692	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18072221
328340	462772	3.160141	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
328440	462772	3.062901	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
328540	462772	3.179717	0.000155	0	0	0	1-HR	ALL	1ST	UCAR T1	18091616
324540	462872	3.484017	0.000135	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
324640	462872	3.631587	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18021214
324740	462872	3.616401	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18112913
324840	462872	3.394235	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
324940	462872	3.028842	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325040	462872	3.153281	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325140	462872	3.342402	0.000223	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325240	462872	3.131801	0.000223	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
325340	462872	3.173938	0.000277	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325440	462872	3.463619	0.000421	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516

325540	462872	3.112601	0.000463	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325640	462872	3.163269	0.00032	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325740	462872	2.718532	0.000313	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
325840	462872	3.675658	0.000551	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325940	462872	2.668498	0.000434	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
326040	462872	2.624941	0.000503	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
326140	462872	3.241848	0.000416	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
326240	462872	3.200604	0.000635	0	0	0	1-HR	ALL	1ST	UCAR T1	18110712
326340	462872	3.587123	0.000662	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326440	462872	5.285625	0.001295	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326540	462872	3.879393	0.00043	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	462872	3.989401	0.000596	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326740	462872	3.8848	0.000886	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
326840	462872	3.90233	0.000557	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
326940	462872	4.609087	0.000759	0.6	0.6	0	1-HR	ALL	1ST	UCAR T1	18030518
327040	462872	6.039223	0.000333	1.4	1.4	0	1-HR	ALL	1ST	UCAR T1	18102414
327140	462872	5.76784	0.000475	2	2	0	1-HR	ALL	1ST	UCAR T1	18120317

327240	462872	6.653485	0.000482	1.9	1.9	0	1-HR	ALL	1ST	UCAR T1	18120317
327340	462872	6.20069	0.000352	1.8	1.8	0	1-HR	ALL	1ST	UCAR T1	18120317
327440	462872	4.465077	0.000268	1.7	1.7	0	1-HR	ALL	1ST	UCAR T1	18050523
327540	462872	4.66869	0.000298	0.3	0.3	0	1-HR	ALL	1ST	UCAR T1	18072321
327640	462872	4.300627	0.000295	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
327740	462872	4.028771	0.000232	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
327840	462872	3.639904	0.000168	0.9	0.9	0	1-HR	ALL	1ST	UCAR T1	18101322
327940	462872	3.853117	0.000202	1.8	1.8	0	1-HR	ALL	1ST	UCAR T1	18101322
328040	462872	3.995473	0.000182	0.3	0.3	0	1-HR	ALL	1ST	UCAR T1	18101322
328140	462872	4.139007	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18051422
328240	462872	3.947754	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18051422
328340	462872	3.543496	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18043016
328440	462872	3.041234	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18043016
328540	462872	2.850847	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18043016
324540	462972	2.800273	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
324640	462972	2.85087	0.000153	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
324740	462972	2.9381	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615

324840	462972	2.999025	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
324940	462972	2.79215	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18111513
325040	462972	3.12734	0.000204	0	0	0	1-HR	ALL	1ST	UCAR T1	18112813
325140	462972	3.317945	0.0003	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325240	462972	3.160193	0.000361	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325340	462972	3.163609	0.000326	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325440	462972	3.385327	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325540	462972	2.971607	0.000254	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
325640	462972	3.845212	0.000399	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325740	462972	3.261572	0.000378	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325840	462972	2.259384	0.000287	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
325940	462972	2.002552	0.000391	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
326040	462972	2.769148	0.000326	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
326140	462972	3.060572	0.000466	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
326240	462972	3.283	0.00103	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326340	462972	3.228098	0.000281	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326440	462972	4.662418	0.000996	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521

326540	462972	3.521352	0.000376	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	462972	3.380281	0.000433	0	0	0	1-HR	ALL	1ST	UCAR T1	18041702
326740	462972	6.340668	0.000682	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
326840	462972	6.514128	0.000585	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
326940	462972	4.519163	0.000357	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327040	462972	4.874419	0.000587	0.1	0.1	0	1-HR	ALL	1ST	UCAR T1	18030518
327140	462972	6.263561	0.000306	1.1	1.1	0	1-HR	ALL	1ST	UCAR T1	18111013
327240	462972	4.581934	0.000303	1	1	0	1-HR	ALL	1ST	UCAR T1	18120317
327340	462972	5.721847	0.000385	0.6	0.6	0	1-HR	ALL	1ST	UCAR T1	18032919
327440	462972	5.742213	0.000335	0.3	0.3	0	1-HR	ALL	1ST	UCAR T1	18120317
327540	462972	5.043265	0.000284	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
327640	462972	3.975188	0.000231	0	0	0	1-HR	ALL	1ST	UCAR T1	18050523
327740	462972	4.013742	0.000227	0	0	0	1-HR	ALL	1ST	UCAR T1	18102413
327840	462972	4.183594	0.000248	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
327940	462972	3.489359	0.000226	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
328040	462972	3.430425	0.000177	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
328140	462972	3.245382	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18091615

328240	462972	3.120135	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18101322
328340	462972	3.441542	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18101322
328440	462972	3.505242	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18051422
328540	462972	3.335783	0.000125	0	0	0	1-HR	ALL	1ST	UCAR T1	18051422
324540	463072	2.622995	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18021615
324640	463072	2.613109	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18111513
324740	463072	2.922508	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18112813
324840	463072	2.992191	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324940	463072	3.037474	0.000278	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325040	463072	3.168619	0.000285	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325140	463072	2.939618	0.000228	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325240	463072	3.326894	0.000164	0	0	0	1-HR	ALL	1ST	UCAR T1	18111514
325340	463072	2.957077	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
325440	463072	3.570324	0.000298	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325540	463072	3.766563	0.000346	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325640	463072	2.119431	0.000293	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
325740	463072	1.804758	0.000314	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619

325840	463072	1.804363	0.000322	0	0	0	1-HR	ALL	1ST	UCAR T1	18032620
325940	463072	2.319717	0.000265	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
326040	463072	2.644109	0.000463	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
326140	463072	2.99647	0.000743	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
326240	463072	2.826538	0.000367	0	0	0	1-HR	ALL	1ST	UCAR T1	18041623
326340	463072	4.432144	0.000238	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326440	463072	2.833606	0.000664	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326540	463072	3.177652	0.000331	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463072	3.111261	0.000427	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463072	5.597975	0.000425	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
326840	463072	3.370147	0.000569	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
326940	463072	4.541458	0.000605	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327040	463072	6.250316	0.000267	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327140	463072	4.920527	0.000471	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327240	463072	5.801478	0.000284	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327340	463072	4.693434	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327440	463072	4.421281	0.000304	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919

327540	463072	5.009512	0.000281	0	0	0	1-HR	ALL	1ST	UCAR T1	18120317
327640	463072	4.944077	0.000246	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
327740	463072	4.419031	0.000236	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
327840	463072	3.680368	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18050523
327940	463072	3.459225	0.000176	0	0	0	1-HR	ALL	1ST	UCAR T1	18102413
328040	463072	3.746309	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
328140	463072	3.465995	0.000203	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
328240	463072	3.090565	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
328340	463072	3.088404	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18091615
328440	463072	2.912207	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18091615
328540	463072	2.880422	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18101322
324540	463172	2.748526	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324640	463172	2.771706	0.000216	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324740	463172	2.874673	0.000238	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324840	463172	2.972185	0.000218	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324940	463172	2.819499	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
325040	463172	3.143402	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18111514

325140	463172	2.81753	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
325240	463172	3.170968	0.00023	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325340	463172	3.714616	0.000292	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325440	463172	2.846632	0.000274	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
325540	463172	1.589434	0.000213	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
325640	463172	1.412912	0.000302	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325740	463172	1.579487	0.000306	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325840	463172	1.934004	0.000221	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325940	463172	2.216997	0.00041	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
326040	463172	2.347696	0.000423	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
326140	463172	2.486252	0.000699	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326240	463172	3.686641	0.000195	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
326340	463172	6.872467	0.000502	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326440	463172	2.587147	0.000436	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326540	463172	2.80381	0.000294	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463172	2.867415	0.000392	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463172	3.717619	0.000369	0	0	0	1-HR	ALL	1ST	UCAR T1	18021714

326840	463172	5.07278	0.000571	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
326940	463172	6.309609	0.000332	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327040	463172	3.740504	0.000366	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327140	463172	6.570182	0.000298	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327240	463172	5.095736	0.000388	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327340	463172	5.139282	0.000261	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327440	463172	4.361402	0.00021	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327540	463172	4.081452	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
327640	463172	4.015899	0.000284	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
327740	463172	4.335238	0.000214	0	0	0	1-HR	ALL	1ST	UCAR T1	18120317
327840	463172	4.208372	0.000216	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
327940	463172	4.207438	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328040	463172	3.526779	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18050523
328140	463172	3.371492	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18102413
328240	463172	3.248516	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18102413
328340	463172	3.224178	0.000174	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
328440	463172	2.851392	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18072320

328540	463172	2.821646	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18072321
324540	463272	2.748662	0.000194	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324640	463272	2.695969	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18030516
324740	463272	2.790213	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18111514
324840	463272	2.915623	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18111514
324940	463272	2.629481	0.000156	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
325040	463272	2.772722	0.000182	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325140	463272	3.42672	0.000241	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325240	463272	3.113964	0.000235	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
325340	463272	2.367011	0.000216	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
325440	463272	1.296932	0.000194	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325540	463272	1.15153	0.000265	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325640	463272	1.368743	0.000283	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325740	463272	1.616795	0.000188	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325840	463272	1.848456	0.000348	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325940	463272	1.808622	0.000282	0	0	0	1-HR	ALL	1ST	UCAR T1	18110712
326040	463272	2.191164	0.000587	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624

326140	463272	2.195239	0.000234	0	0	0	1-HR	ALL	1ST	UCAR T1	18041623
326240	463272	4.370981	0.000228	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326340	463272	6.437573	0.000661	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326440	463272	2.177906	0.000243	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326540	463272	2.451812	0.000264	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463272	2.557082	0.000344	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463272	3.519031	0.000347	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326840	463272	6.508812	0.000457	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
326940	463272	3.42066	0.0004	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327040	463272	5.151383	0.000457	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327140	463272	3.808623	0.000231	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327240	463272	6.127557	0.000298	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327340	463272	5.026819	0.000326	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327440	463272	4.496284	0.000239	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327540	463272	3.992538	0.00019	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327640	463272	3.761142	0.000197	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
327740	463272	3.905352	0.000232	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919

327840	463272	3.835587	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
327940	463272	3.659571	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18101323
328040	463272	4.098421	0.00019	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328140	463272	3.922772	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328240	463272	3.314957	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18050523
328340	463272	3.190192	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18051420
328440	463272	3.070742	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18102413
328540	463272	2.906966	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18102413
324540	463372	2.716166	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18111514
324640	463372	2.728413	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
324740	463372	2.430573	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
324840	463372	2.416681	0.000158	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
324940	463372	3.07132	0.000199	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325040	463372	3.087878	0.000207	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
325140	463372	2.716777	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
325240	463372	2.194169	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
325340	463372	1.104496	0.00021	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619

325440	463372	0.962217	0.000228	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
325540	463372	1.185492	0.000258	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325640	463372	1.859467	0.000162	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325740	463372	2.14944	0.000292	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325840	463372	1.663027	0.000252	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325940	463372	1.95339	0.000484	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
326040	463372	2.985632	0.000456	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326140	463372	3.281823	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
326240	463372	3.951998	0.000152	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326340	463372	4.671931	0.000566	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326440	463372	1.96151	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326540	463372	2.138482	0.000239	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463372	2.248924	0.000294	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463372	3.399348	0.000296	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326840	463372	5.362215	0.000309	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
326940	463372	3.315381	0.000453	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327040	463372	5.237955	0.000215	0	0	0	1-HR	ALL	1ST	UCAR T1	18101418

327140	463372	3.00516	0.000396	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327240	463372	4.140754	0.000223	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327340	463372	5.416532	0.000283	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327440	463372	4.830872	0.000278	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327540	463372	3.934637	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327640	463372	3.535508	0.000168	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327740	463372	3.645557	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
327840	463372	3.875309	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
327940	463372	3.412618	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328040	463372	3.700708	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328140	463372	3.376016	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18101323
328240	463372	3.886147	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328340	463372	3.623851	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328440	463372	3.088747	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18050523
328540	463372	2.972389	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18051420
324540	463472	2.297945	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613
324640	463472	2.111389	0.00014	0	0	0	1-HR	ALL	1ST	UCAR T1	18112613

324740	463472	2.721708	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
324840	463472	2.914498	0.000183	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
324940	463472	2.716284	0.000191	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
325040	463472	2.759609	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
325140	463472	1.815683	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18032615
325240	463472	1.01024	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325340	463472	0.823558	0.000203	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
325440	463472	1.03056	0.000234	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325540	463472	2.045753	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325640	463472	2.529513	0.000245	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325740	463472	1.488257	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325840	463472	2.177307	0.000324	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325940	463472	2.88356	0.000459	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326040	463472	2.227718	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18041623
326140	463472	4.223961	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326240	463472	5.117894	0.000252	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326340	463472	2.979505	0.000385	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701

326440	463472	2.276574	0.000076	0	0	0	1-HR	ALL	1ST	UCAR T1	18032708
326540	463472	1.866492	0.000218	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463472	1.968912	0.000249	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463472	3.238748	0.00023	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326840	463472	4.655139	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18021714
326940	463472	4.820625	0.00036	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327040	463472	3.414291	0.000296	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327140	463472	4.722643	0.000321	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327240	463472	3.549029	0.000262	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327340	463472	4.320853	0.00018	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327440	463472	4.680309	0.000262	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327540	463472	4.5776	0.000241	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327640	463472	3.759856	0.000202	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327740	463472	3.218236	0.000147	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327840	463472	3.429535	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327940	463472	3.522215	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
328040	463472	3.622374	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919

328140	463472	3.570751	0.000189	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328240	463472	3.359861	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18101323
328340	463472	3.255895	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328440	463472	3.636773	0.00015	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
328540	463472	3.337322	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
324540	463572	2.405147	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
324640	463572	2.682704	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
324740	463572	2.528436	0.000164	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
324840	463572	2.975423	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
324940	463572	2.509155	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18032615
325040	463572	1.402745	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325140	463572	0.899006	0.000195	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325240	463572	0.746062	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
325340	463572	0.900784	0.000211	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325440	463572	2.147473	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325540	463572	2.752828	0.000207	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325640	463572	1.315505	0.000214	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714

325740	463572	2.484053	0.000196	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325840	463572	2.160347	0.000413	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325940	463572	3.073478	0.00031	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
326040	463572	2.976604	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
326140	463572	3.744847	0.00017	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326240	463572	5.104329	0.00037	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326340	463572	3.042754	0.000373	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	463572	2.673897	0.000074	0	0	0	1-HR	ALL	1ST	UCAR T1	18031517
326540	463572	1.864376	0.000201	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463572	2.182082	0.000211	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463572	3.520645	0.000203	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	463572	3.879529	0.000256	0	0	0	1-HR	ALL	1ST	UCAR T1	18021714
326940	463572	5.397342	0.00033	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
327040	463572	3.424153	0.000357	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327140	463572	4.252809	0.000171	0	0	0	1-HR	ALL	1ST	UCAR T1	18101418
327240	463572	3.270177	0.000342	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327340	463572	3.496904	0.00017	0	0	0	1-HR	ALL	1ST	UCAR T1	18081219

327440	463572	4.208072	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327540	463572	4.013932	0.000239	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327640	463572	4.306151	0.000211	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327740	463572	3.616307	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327840	463572	3.10486	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
327940	463572	3.12224	0.00014	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328040	463572	3.301659	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
328140	463572	3.596	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328240	463572	3.117463	0.000179	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328340	463572	3.444184	0.000152	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328440	463572	3.053858	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18101323
328540	463572	3.163182	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18111014
324540	463672	2.479552	0.000138	0	0	0	1-HR	ALL	1ST	UCAR T1	18110713
324640	463672	2.926752	0.000157	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
324740	463672	2.921243	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18021619
324840	463672	2.112719	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18032615
324940	463672	1.036542	0.000154	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619

325040	463672	0.786742	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
325140	463672	0.673889	0.000169	0	0	0	1-HR	ALL	1ST	UCAR T1	18032620
325240	463672	0.854886	0.000191	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325340	463672	2.208212	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325440	463672	2.899147	0.000176	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325540	463672	1.651415	0.000212	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325640	463672	2.447347	0.000181	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325740	463672	2.498508	0.000345	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325840	463672	3.161729	0.00036	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325940	463672	2.517252	0.000116	0	0	0	1-HR	ALL	1ST	UCAR T1	18110518
326040	463672	3.642195	0.000112	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326140	463672	3.416939	0.000108	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326240	463672	4.326083	0.000404	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326340	463672	3.290515	0.00031	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	463672	2.909662	0.000071	0	0	0	1-HR	ALL	1ST	UCAR T1	18031517
326540	463672	1.986688	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463672	2.459558	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820

326740	463672	3.513346	0.000214	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	463672	4.246506	0.000241	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326940	463672	4.721467	0.000241	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
327040	463672	3.54583	0.000323	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327140	463672	3.416842	0.000228	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327240	463672	4.085231	0.000224	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327340	463672	3.052474	0.000283	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327440	463672	3.446472	0.000167	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327540	463672	4.074007	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327640	463672	3.819939	0.000217	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327740	463672	4.037536	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327840	463672	3.453012	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
327940	463672	2.996742	0.000119	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328040	463672	3.061871	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328140	463672	3.172835	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
328240	463672	3.34845	0.000135	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
328340	463672	3.242774	0.000153	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919

328440	463672	3.20873	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328540	463672	3.173966	0.000118	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
324540	463772	3.056629	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18032617
324640	463772	2.647976	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18032615
324740	463772	1.685832	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18032615
324840	463772	0.785882	0.000155	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
324940	463772	0.681931	0.000156	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
325040	463772	0.60777	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18032620
325140	463772	0.928015	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325240	463772	2.236499	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325340	463772	2.982963	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325440	463772	1.941613	0.000203	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325540	463772	2.24384	0.000179	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325640	463772	2.527026	0.000251	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325740	463772	2.626366	0.000311	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325840	463772	2.926147	0.00022	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325940	463772	3.212125	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615

326040	463772	3.633788	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326140	463772	3.734223	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326240	463772	3.31033	0.000361	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326340	463772	3.269052	0.000234	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	463772	3.032355	0.000067	0	0	0	1-HR	ALL	1ST	UCAR T1	18031517
326540	463772	2.07062	0.000172	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463772	2.66798	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326740	463772	3.318821	0.000215	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	463772	4.094284	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326940	463772	4.340464	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
327040	463772	4.627232	0.000284	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
327140	463772	3.220109	0.000284	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327240	463772	3.495276	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18101418
327340	463772	3.244518	0.000272	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327440	463772	3.197141	0.000198	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327540	463772	3.641655	0.000162	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327640	463772	3.824652	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518

327740	463772	3.626857	0.000196	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327840	463772	3.782353	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327940	463772	3.284153	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328040	463772	2.853904	0.000115	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328140	463772	2.949386	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328240	463772	2.945281	0.000109	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328340	463772	2.98331	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
328440	463772	3.230976	0.000121	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
328540	463772	2.791134	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18032919
324540	463872	2.263311	0.000109	0	0	0	1-HR	ALL	1ST	UCAR T1	18032615
324640	463872	1.295362	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
324740	463872	0.719197	0.000149	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
324840	463872	0.588321	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
324940	463872	0.547899	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325040	463872	0.98537	0.000156	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325140	463872	2.239621	0.000105	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325240	463872	3.017963	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714

325340	463872	2.177678	0.00019	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325440	463872	1.967691	0.000165	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325540	463872	2.737406	0.000168	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325640	463872	2.507208	0.000306	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325740	463872	3.133385	0.000277	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325840	463872	2.636008	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18110518
325940	463872	3.035709	0.000096	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
326040	463872	3.122504	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326140	463872	3.865571	0.000221	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326240	463872	2.450814	0.000283	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326340	463872	3.0689	0.000166	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	463872	3.066513	0.000062	0	0	0	1-HR	ALL	1ST	UCAR T1	18031517
326540	463872	2.122823	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463872	2.814813	0.000147	0	0	0	1-HR	ALL	1ST	UCAR T1	18021716
326740	463872	3.025597	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	463872	3.625323	0.000192	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326940	463872	3.618879	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18021714

327040	463872	4.800374	0.000252	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
327140	463872	3.25264	0.000279	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327240	463872	3.262914	0.00018	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327340	463872	3.500983	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327440	463872	2.986834	0.000261	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327540	463872	3.136742	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18081219
327640	463872	3.650094	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327740	463872	3.527001	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327840	463872	3.416963	0.000178	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327940	463872	3.648936	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
328040	463872	3.117922	0.000148	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328140	463872	2.796529	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328240	463872	2.785434	0.000111	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328340	463872	2.841818	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328440	463872	3.05887	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
328540	463872	3.064221	0.00011	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
324540	463972	0.969349	0.000119	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619

324640	463972	0.650703	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
324740	463972	0.506897	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18021618
324840	463972	0.496159	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324940	463972	1.028637	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
325040	463972	2.22367	0.000098	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325140	463972	3.015824	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325240	463972	2.359954	0.000175	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325340	463972	1.678509	0.000144	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325440	463972	2.727663	0.000123	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325540	463972	2.699343	0.000259	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325640	463972	2.799626	0.000265	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325740	463972	2.688861	0.000162	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325840	463972	3.26293	0.000106	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
325940	463972	3.251454	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326040	463972	3.254181	0.000087	0	0	0	1-HR	ALL	1ST	UCAR T1	18122014
326140	463972	3.567372	0.000266	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326240	463972	2.756515	0.000254	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701

326340	463972	2.773211	0.000113	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	463972	3.082068	0.000057	0	0	0	1-HR	ALL	1ST	UCAR T1	18031517
326540	463972	2.149431	0.000151	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	463972	2.909534	0.000147	0	0	0	1-HR	ALL	1ST	UCAR T1	18021716
326740	463972	2.695528	0.000199	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	463972	3.192114	0.000158	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
326940	463972	3.778057	0.000195	0	0	0	1-HR	ALL	1ST	UCAR T1	18021714
327040	463972	4.227938	0.000197	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
327140	463972	3.58688	0.000243	0	0	0	1-HR	ALL	1ST	UCAR T1	18032815
327240	463972	2.912339	0.000229	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327340	463972	3.135764	0.00012	0	0	0	1-HR	ALL	1ST	UCAR T1	18080117
327440	463972	3.014073	0.000209	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327540	463972	2.90887	0.000213	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327640	463972	3.257073	0.000132	0	0	0	1-HR	ALL	1ST	UCAR T1	18081219
327740	463972	3.500603	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327840	463972	3.219988	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
327940	463972	3.205108	0.000161	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518

328040	463972	3.570318	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
328140	463972	2.958785	0.000137	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328240	463972	2.726741	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328340	463972	2.638486	0.0001	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328440	463972	2.827247	0.000104	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328540	463972	3.01938	0.000094	0	0	0	1-HR	ALL	1ST	UCAR T1	18101324
324540	464072	0.584505	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18032619
324640	464072	0.437183	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18110515
324740	464072	0.450155	0.000139	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324840	464072	1.059685	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324940	464072	2.193552	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325040	464072	2.986113	0.000104	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325140	464072	2.493098	0.00016	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325240	464072	1.407805	0.000127	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325340	464072	2.568881	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325440	464072	2.622704	0.000198	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325540	464072	2.456368	0.000246	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624

325640	464072	2.955722	0.000213	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325740	464072	2.644616	0.000091	0	0	0	1-HR	ALL	1ST	UCAR T1	18110518
325840	464072	3.092802	0.000092	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
325940	464072	2.943025	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326040	464072	2.945763	0.000096	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326140	464072	3.036407	0.000273	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326240	464072	3.029692	0.000248	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326340	464072	2.442377	0.000075	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	464072	3.09679	0.000058	0	0	0	1-HR	ALL	1ST	UCAR T1	18021717
326540	464072	2.155804	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715
326640	464072	2.961728	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18021716
326740	464072	2.36636	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	464072	3.214447	0.000129	0	0	0	1-HR	ALL	1ST	UCAR T1	18041702
326940	464072	3.97041	0.000184	0	0	0	1-HR	ALL	1ST	UCAR T1	18021714
327040	464072	3.770659	0.000164	0	0	0	1-HR	ALL	1ST	UCAR T1	18032817
327140	464072	4.161777	0.000234	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
327240	464072	3.096034	0.000237	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318

327340	464072	3.048145	0.000145	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327440	464072	3.019646	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18101418
327540	464072	2.951623	0.000223	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327640	464072	2.942218	0.000155	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327740	464072	3.164825	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327840	464072	3.260359	0.000088	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327940	464072	2.924403	0.000123	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
328040	464072	3.150046	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
328140	464072	3.478154	0.000123	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328240	464072	2.808934	0.000128	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328340	464072	2.671594	0.000102	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328440	464072	2.582338	0.00009	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
328540	464072	2.754442	0.000099	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
324540	464172	0.428246	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18110515
324640	464172	0.409462	0.000131	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324740	464172	1.080352	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324840	464172	2.153149	0.000087	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101

324940	464172	2.936418	0.0001	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
325040	464172	2.583612	0.000146	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325140	464172	1.369026	0.00013	0	0	0	1-HR	ALL	1ST	UCAR T1	18110714
325240	464172	2.327975	0.000136	0	0	0	1-HR	ALL	1ST	UCAR T1	18112614
325340	464172	2.686188	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325440	464172	2.583769	0.000235	0	0	0	1-HR	ALL	1ST	UCAR T1	18041624
325540	464172	2.782984	0.000221	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325640	464172	2.431533	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18030517
325740	464172	3.203758	0.000094	0	0	0	1-HR	ALL	1ST	UCAR T1	18110615
325840	464172	2.818214	0.000089	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
325940	464172	2.95106	0.000101	0	0	0	1-HR	ALL	1ST	UCAR T1	18110520
326040	464172	3.018988	0.000141	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326140	464172	2.81407	0.00025	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
326240	464172	3.135417	0.000223	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326340	464172	2.316378	0.000049	0	0	0	1-HR	ALL	1ST	UCAR T1	18041701
326440	464172	3.069276	0.000061	0	0	0	1-HR	ALL	1ST	UCAR T1	18021717
326540	464172	2.146453	0.000134	0	0	0	1-HR	ALL	1ST	UCAR T1	18110715

326640	464172	2.980119	0.000142	0	0	0	1-HR	ALL	1ST	UCAR T1	18021716
326740	464172	2.222176	0.000171	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326840	464172	3.365154	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18032820
326940	464172	3.866009	0.000173	0	0	0	1-HR	ALL	1ST	UCAR T1	18032821
327040	464172	3.342076	0.000122	0	0	0	1-HR	ALL	1ST	UCAR T1	18032823
327140	464172	4.154785	0.0002	0	0	0	1-HR	ALL	1ST	UCAR T1	18120319
327240	464172	2.788384	0.000222	0	0	0	1-HR	ALL	1ST	UCAR T1	18032815
327340	464172	2.667758	0.000186	0	0	0	1-HR	ALL	1ST	UCAR T1	18120318
327440	464172	2.960249	0.000106	0	0	0	1-HR	ALL	1ST	UCAR T1	18080117
327540	464172	2.797035	0.000159	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327640	464172	3.005775	0.000204	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327740	464172	2.808239	0.000104	0	0	0	1-HR	ALL	1ST	UCAR T1	18032814
327840	464172	2.987818	0.000126	0	0	0	1-HR	ALL	1ST	UCAR T1	18041719
327940	464172	2.978035	0.000075	0	0	0	1-HR	ALL	1ST	UCAR T1	18032219
328040	464172	2.79081	0.000117	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
328140	464172	3.143292	0.000133	0	0	0	1-HR	ALL	1ST	UCAR T1	18030518
328240	464172	3.377697	0.000114	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013

328340	464172	2.6692	0.00012	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328440	464172	2.61748	0.000098	0	0	0	1-HR	ALL	1ST	UCAR T1	18111013
328540	464172	2.547657	0.00008	0	0	0	1-HR	ALL	1ST	UCAR T1	18102414
324540	464272	0.437467	0.000124	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324640	464272	1.092337	0.000107	0	0	0	1-HR	ALL	1ST	UCAR T1	18032618
324740	464272	2.105494	0.000082	0	0	0	1-HR	ALL	1ST	UCAR T1	18041101
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326040	464372	2.702054	0.000196	0	0	0	1-HR	ALL	1ST	UCAR T1	18031521
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Produced by:	AERMOD View V	er. 9.7.0									
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SRCEMISS S1	0.0804										
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SRCEMISS GSS	TACK 0.2769										
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CONCUNIT ug	/m^3										
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Appendix 16

APPLICATION TO ACCESS

JAPAN FUND FOR THE JOINT CREDITING MECHANISM (JFJCM) RESOURCES

For Grant component of an Investment Project, for Stand-alone Grant Project, and for Non-sovereign project

I. Basic Data

Title of Proposed Project	Greater Male Waste to Energy Project (Phase 2 of Greater Male Environmental Improvement and Waste Management Project)
Country	Maldives
Sector	Urban
Amount Requested from JFJCM	$10 million
Non-JFJCM Loan amount and source of the project	$127.12 million (tbc – exclusive of financing charges) - Asian Development Bank (ADB): $60 million, - Asian Infrastructure Investment Bank (AIIB): $40 million (tbc), - Islamic Development Bank: $19.39 million - Government of Maldives (GOM): $7.73 million
Planned ADB Approval Date	Q2 2020
Duration	60 months from October 2020 to September 2025
Name of Project Officer	Luca Di Mario, SAUW ldimario@adb.org +63 2 632 5079
Name of Director	Norio Saito, Director SAUW nsaito@adb.org +63 2 632 6858
Division/Resident Mission	Urban Development and Water Division, SARD

II. Specific data

1. Description of the project and the subcomponent/s with the advanced low carbon technology

The Greater Male Environmental Improvement and Waste Management Project (the Project) will establish an integrated regional solid waste management system in Greater Male including collection, transfer, treatment using waste-to-energy (WtE) technology, disposal, recycling, dumpsite closure and remediation, public awareness in reduce-reuse-recycle (3R), and to strengthen institutional capacities for service delivery and environmental monitoring.

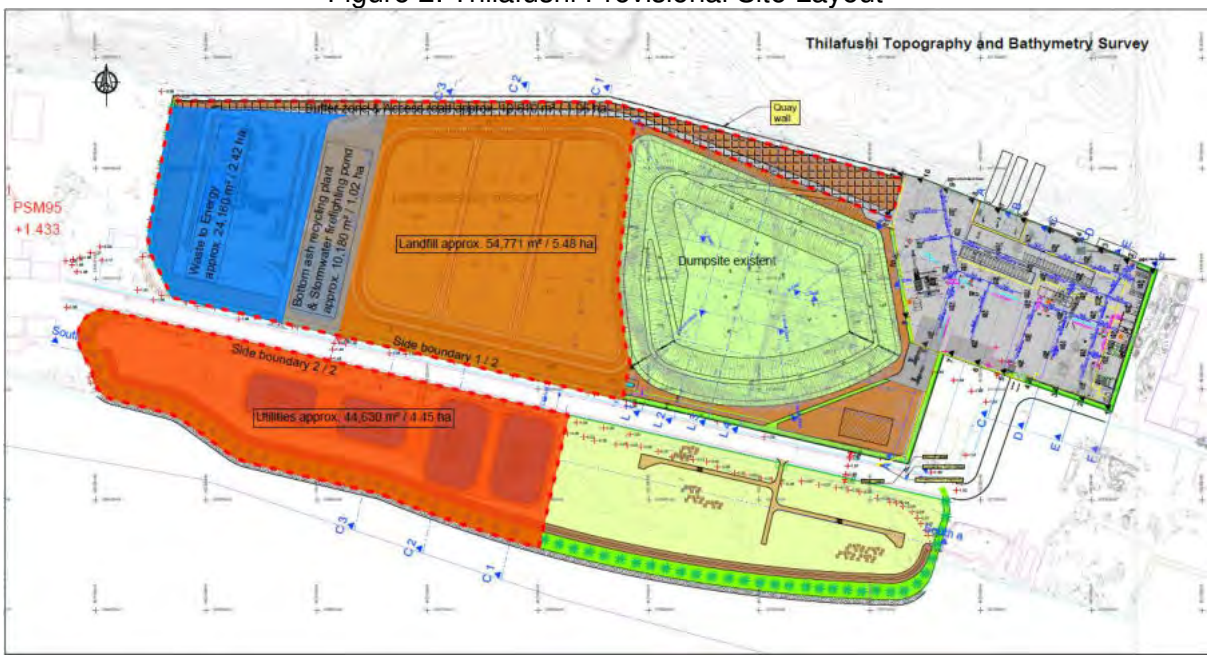
The project will be implemented in two phases. Phase 1, with an estimated cost of $40 million, was approved by ADB in 2018, has the following components: (i) improved waste collection and transfer in Greater Male, (ii) improved dumpsite management and logistics on Thilafushi Island, (iii) improved island waste management systems, (iv) strengthened institutional capacity of WAMCO, (v) awareness campaign and behavior change, and (vi) project management, design, and supervision support.

Phase 2 (Greater Male Waste to Energy Project) is planned for ADB approval in 2020, with total estimated cost of $137.12 million (exclusive of contingency and financing charges). It includes the following components: (i) development of regional waste management facility with 500 tons/day WtE plant with up to 11 MW power generation, (ii) Thilafushi dumpsite rehabilitation and remediation, (iii) strengthened institutional capacity to monitor standards and performance of WtE, and (iv) improved public awareness

The development of a 500 tons/day WtE plant envisioned under the Greater Male Waste to Energy Project seeks funding from the JFJCM. The required land (approx. 15 ha) has been reclaimed by the Government to accommodate the plant and ancillary facilities on the island of Thilafushi, which is an industrial island 6 kilometers from the capital Male.

Figure 1: Location of Thilafushi

Figure 2: Thilafushi Provisional Site Layout



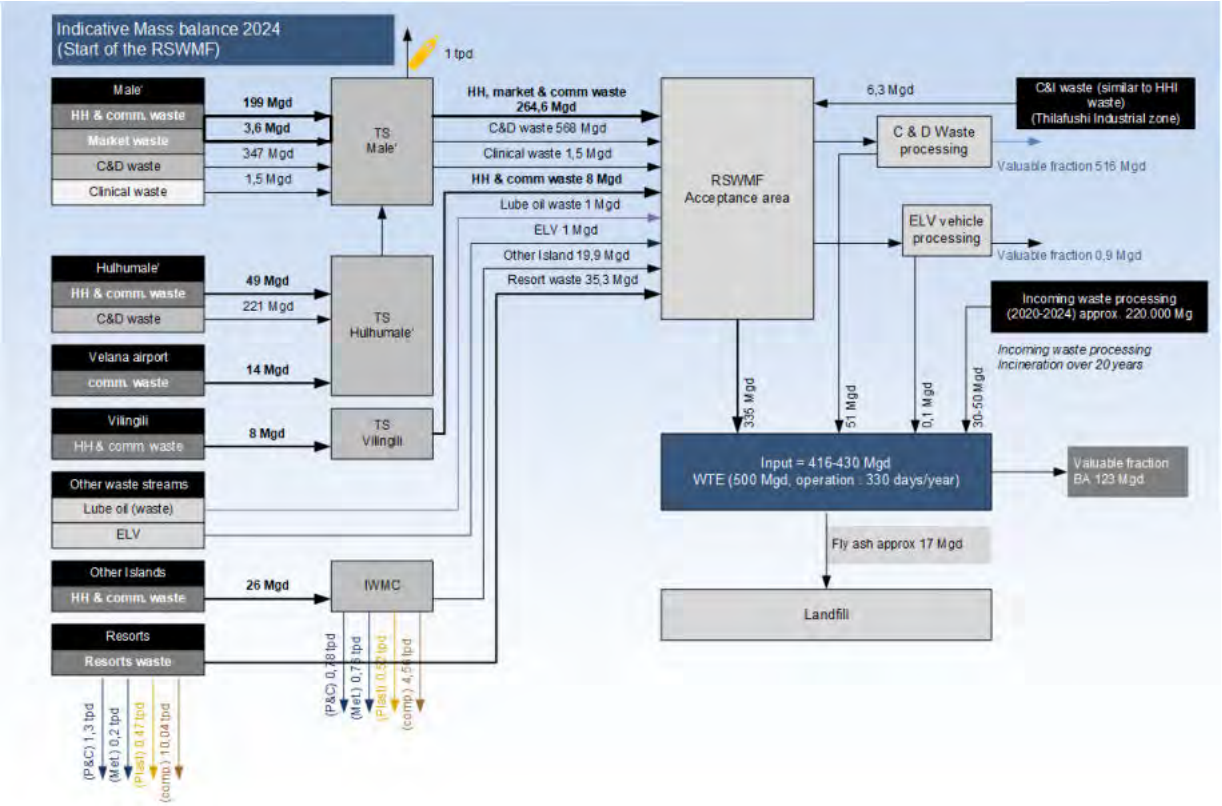
Government capacity to operate and maintain Phase 1 and Phase 2 (WtE) is supported by the Clean Authority of Tokyo (CAT), which is the public body in charge of coordinating solid waste management across Tokyo. The Project will reflect the lessons learned from the Tokyo model to effectively construct and operate the WtE system as well as to build trust for the WtE among the surrounding communities.

The project will provide integrated and sustainable solid waste management services in the Greater Malé region (Malé, Villingili & Hulhumalé) including the inhabited islands in atolls of Kaafu, Alifu Alifu, Alifu Dhaalu and Vaavu. The project area has a population of approximately 220,000 (51% of Maldives) which is spread over 35 islands and 73 tourist resorts. The population is expected to grow to 300,000 within the next five years due to the significant development of Hulhumale. Together with commercial and industrial entities, institutions and about 1 million tourists, in 2022 the residents will generate approximately 115,000 tons of Municipal Solid Waste (MSW) per year (around 315 tons per day) which is complemented by another 70,000 to 100,000 tons of construction and demolition waste (CDW). Around 10 to 15% of the CDW material is assumed to be flammable.

The 500 tons/day plant size considers projected waste growth in the Greater Male region up to 2038 and the incineration of waste bales during initial years of operations. The waste bales will be produced as temporary solid waste management solution on Thilafushi until the WtE will be commissioned. After 2039, it is planned to install additional treatment line to meet the growing waste management requirement. An indicative mass balance of the waste in the Greater Male area at the start of the WtE (2024) is summarized in Figure 3.

The latest waste audit carried out by the feasibility study consultants confirmed previous waste surveys and showed the following composition: food & kitchen waste 40%, green & garden waste 10%, other organic waste 10%, paper and cardboard 12%, plastic 10%, hazardous waste 1%, metal 4%, glass 3%, and other 10%. The net calorific value (NCV) of the waste is 7.5 MJ/kg.

Figure 3: Indicative Mass Balance of the waste in the Greater Male area (2024)



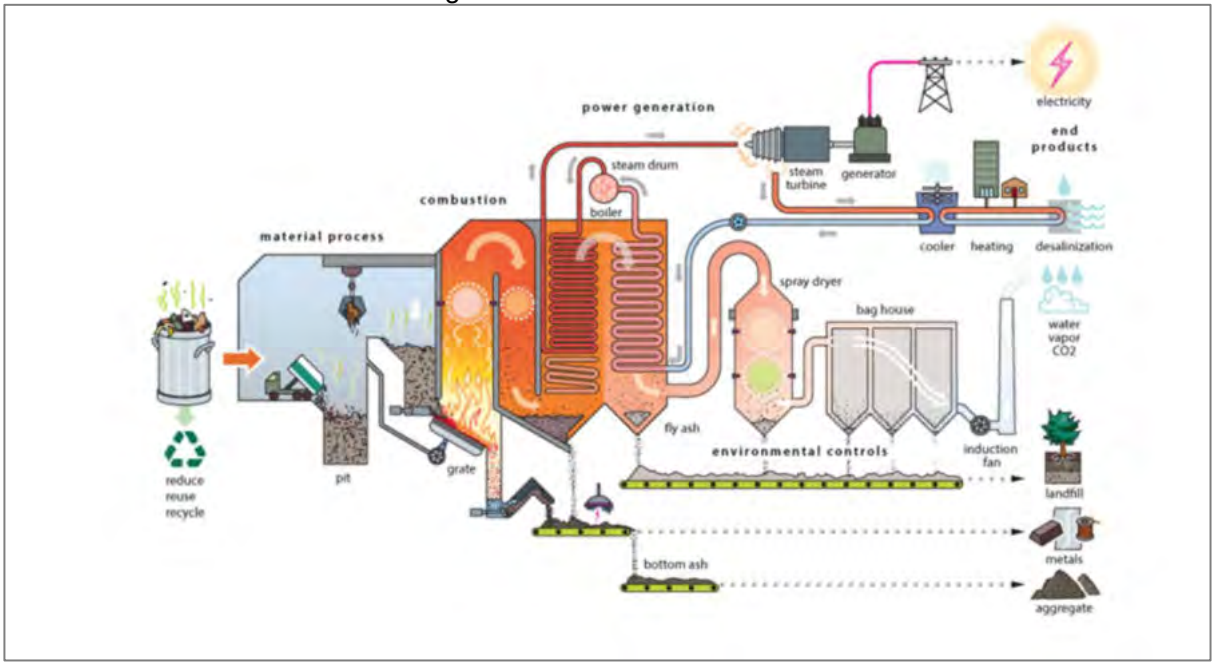
The project feasibility study selected a state-of-the-art WtE treatment based on a grate incineration due to land constraints on Thilafushi and sustainability considerations (best practicable environmental option). This WtE process is a well-known, reliable and robust disposal solution that can accommodate best the urgent needs for an environmental improvement of the waste management in the Maldives and that can cope with a broad variety of untreated waste.

The WtE subcomponents are:

- Waste reception and bunker/refuse pit
- Furnace including feeding hopper and pusher, moving grate and wet de-asher
- Boiler including superheaters and economizer
- Flue gas cleaning
- Extraction condensing type turbine and sea water cooled condenser
- Generator

The basic WtE process is shown in the following schematic diagram:

Figure 4: Basic WtE Process



The final design of the facility will be subject to the Design-Build-Operate (DBO) Contractor. A DBO procurement was chosen to minimize operational risks as such facility requires specialist know how that is not available in the Maldives.

All equipment the DBO contractor will install has to meet state-of-the art design and durability criteria such as 8,000 hours/year availability, high standards for protection of the corrosion prone boiler zones, redundancy of important equipment (waste feeding cranes, boiler feed water pumps, cooling water pumps etc.). The facility will be built as a two-train unit (250 tons/day x 2) thus allowing to accommodate any overhaul or revision without compromising the waste disposal entirely for the period of the overhaul.

Emission standards the flue gas treatment system has to meet will follow the latest European regulations while the capacity of local EPA will be strengthened to enable operational monitoring of the facility (partnership with the Clean Authority of Tokyo is addressing this). Furthermore, ADB will finance one year of monitoring of the facility through the design and construction supervision consultant that will be recruited to manage the entire design-build period.

The extraction condensing turbine will allow a versatile usage of the energy surplus the facility is generating either by producing electricity or both heat and electricity. The usage of surplus energy will depend on the local requirements such as production of ice flakes, water, generation of cooling energy etc.

The Government of the Maldives is planning to develop Thilafushi island as an industrial hub and plans are maturing to construct a bridge between the capital city of Male and the island that would facilitate to link the electricity grid on Thilafushi with the Male network. Once the network link is established, the power surplus of the WtE facility that is envisaged to be in the range between 6 and 9 MW (increase overtime) that can be fed into the network substituting diesel-based electricity generation that is the still predominant source of power generation in the Maldives. Given the current status of the waste treatment and the land scarcity of the Maldives, the WtE facility may be regarded as a measure that must not be delayed.

If the power link does not materialize via the bridge, the local grid operator STELCO may consider a submarine cable as the fuel savings due to the power fed into by the WtE plant are so significant that such submarine cable will provide a quick return on investment.

Calculating the CO2, the power output as per section 7 has been applied.

The outcomes from the implementing the subproject are (i) cleaner environment with no litter and smoke reaching Male or resorts, (ii) reduced leachate pollution into marine environment, and (iii) reduced emissions of greenhouse gasses (GHG). The impact is a healthy living environment in Greater Male.

The cost of the Project (base costs plus taxes) is currently expected to be about $137.12 million (tentative), with financing from ADB ($60.0 million), AIIB ($40.0 million), JFJCM ($10.0 million), Islamic Development Bank ($19.39 million), and the Government of Maldives ($7.73 million). According to Government consultants preparing DBO, the preliminary cost estimate for the WtE subcomponent (incl. the residue landfill) is $95.8 million (base costs plus taxes).

In the current schedule, bidding and procurement is expected in Q4 2019 to Q4 2020, with construction beginning in Q1 2021 and commissioning in Q4 2024. The design life time of the WtE subcomponent is more than 30 years. A 20 years operation and maintenance period is foreseen in the contract package.

2. Background of the project

Solid waste management in the project area is a top priority that has been acknowledged by the previous and the current government.

To date the majority of the waste generated within Zone 3 is dumped haphazardly on the island Thilafushi which is located close to the capital Malé. Waste from Malé, Hulhumale and Vilimale is delivered with landing crafts while resorts are using a vessel called “dhonis”. The island Thilafushi itself has been created using both MSW and CDW as reclamation material for more than 25 years now. Starting in 1992, land has been reclaimed from the lagoons to build up the artificial island.

Greater Male severely lacks an organized and environmentally sustainable solid waste management system. Waste management is operated by the recently established (2015) Waste Management Corporation Limited (WAMCO). Though the collection system is working under the conditions found in Male, there is no separate collection of construction, demolition, and hazardous wastes and no source separation of recyclables.

On small islands and low-cost resorts waste is dumped on beaches or in the deep ocean, and backyard burning or setting fires to open dump sites is a common practice on small islands with limited public awareness of 3R approaches.

Collected waste from Male, Hulhumale and Vilimale is transported on barges to the artificially created, industrially zoned Thilafushi Island located 6 kilometers from Male. The 30-year old 10-hectare open dumpsite managed by WAMCO has no leachate control systems and deliberate burning result in plumes of smoke and severe air pollution hazards to on-site workers, Male residents, and surrounding tourists generating frequent complaints. On-site equipment and site logistics are not sufficient or optimal to efficiently manage the growing volumes of incoming waste.

Reducing the GHG emissions is an urgent issue in Maldives as stated in the Maldives’ climate change mitigation target as described in its Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention Climate Change (UNFCCC) secretariat

in April 2016. According to the NDC, Maldives has outlined a series of policies and measures that the country commits to implement up to 2030, in the energy, transportation and waste sectors. The expected mitigation impact of these policies and measures will be a 10% reduction in total national GHG emissions by 2030, compared to the projected emissions under a business as usual scenario. The 10% reduction expressed above could be increased up to 24% in a conditional manner, in the context of sustainable development, supported and enabled by availability of financial resources, technology transfer and capacity building.

3. Anticipated technology specification and usage

As mentioned above, the main objective of the Project is to implement a ready-to-use and state-of-the-art technology that is capable to process a wide range of untreated waste and that is robust and reliable. The feasibility study consultant of the Government of the Maldives evaluated various technologies and compared them with respect to their technical, environmental, social and economic aspects.

(1) Grate incineration: Incineration on a moving grate can offer manifold examples throughout the world (more than 2,400 treatment lines), can process a wide range of untreated waste, is known for its reliability and robustness and is applied by many waste management companies and public bodies worldwide. Because of these factors, the lower investment and operational expenditures, and particularly, because of the urgent need for a disposal solution, the grate incineration was ranked highest.
(2) Gasification: The Government's consultant compared the currently available gasification technologies for MSW (fixed and fluidized bed, plasma). All of them require a tailored waste input and an advanced waste collection and pre-processing system prior to the thermal treatment. Given the current status of the waste management in Male and in Zone III, the requirements for waste pre-treatment, the lower energy output, the need for constant auxiliary fuel (fixed bed) and the higher CAPEX and OPEX for these technologies, they were not considered for the tendering.
(3) Combination of incineration and anaerobic digestion of the biological waste material: The residues from the pre-processing and from the anaerobic digestion would then be incinerated. Though this option can be superior with respect to the energy output, the land required for the two facilities and the higher costs do not favor this option.

Given the evaluation, the grate incineration technology is selected. The track record of incineration with the moving grate technology shows the reliability and the range of wastes can be processed effectively.

4. Anticipated technology provider (to confirm the implementation and operation record)

Because of the mode of the procurement, the tender does not focus only on the technology providers only but has to also take into considerations waste management companies and O&M companies that can evidence their experiences in operating WtE plants that were built based on either PPP/BOT or DBO contracts.

Based on a pre-evaluation of the market, the following potentially interested companies were identified:

Babcock & Wilcox (O&M company and technology provision through a Danish subsidiary)
China Everbright (O&M company)
China National Electric Engineering (EPC contractor and O&M company)
CNIM S.A. (technology provider and O&M company)

Hitachi Zosen (technology provider and O&M company)
JFE Engineering (technology provider and O&M company)

Keppel Seghers (technology provider and O&M company)
Mitsubishi Heavy Industries Environmental & Chemical Engineering (technology provider and O&M company)
Posco Engineering & Construction Ltd (EPC contractor and O&M company, technology provision via a German subsidiary)
Suez Environnement (O&M company)

Urbaser (O&M company)
Wheelabrator (O&M company).

As it can be assumed that O&M companies team up with technology providers, the following technology providers were additionally included in the evaluation to extend the range of O&M companies that were not addressed in the first round:

Steinmüller-Babcock Environment
Termomeccanica

O&M companies that denied having an interest in the project were Veolia, FCC, Beijing Capital Environment and Sembcorb.

5. Technical specifications and evaluation and qualification criteria for procurement of the subcomponent

A design build operate (DBO) contract will be used as a procurement method, and the contractor will be awarded through international competitive bidding. Some of the main required specifications and qualifications are as follows.

(1) Technical Specifications

Main features of the state-of-the art WtE facility are robustness, reliability and durability of the electro-mechanical and civil components. As such, the following will be requested to the DBO contractor:

- Overall durability criteria for the civil and electro-mechanical part such as life time expectancy for the civil components of 50 years, turbine 40 years, moving grate 30 years, electrical components 30 years, fans/pumps 15 years, etc., all steel equipment and steel structure to be corrosion protected, track record for the grate technology applied;
- Minimum material thickness of erosion/abrasion/corrosion prone components (such as feeding hopper, pusher duct, boiler walls etc.)
- Redundancy of certain crucial components (waste cranes, boiler feed water and condensate pumps, hydraulic systems, cooling water pumps, etc.)

The basic specifications for the WtE and ancillary facilities are summarized in the table below. The final design and arrangement of the facilities within the project site will depend on the DBO Contractor. The Contractor will be required to adopt state-of-the-art incineration technology.

Table 1: Preliminary Design Parameters of the WtE and Ancillary Facilities

Parameter		Range/Data/Type	Remarks
WtE - Facility			
Capacity	t/y	167,000	
	t/hr	21	
No of trains		2	
NCV	kJ/kg	6,500 – 9,500	

Design NCV	kJ/kg	7,500	
Expected IBA amount	%	25	of input
Baled waste input	%	min. 10	of nominal mechanical capacity
Overload	%	10	of nominal thermal and mechanical capacity
Furnace		grate system 850°C, 2s	roller, forward or reciprocating
Boiler		natural circulation	horizontal or vertical boiler passes, cladding of corrosion prone boiler components
Turbine		extraction condensing	robustness is crucial, no. of turbines subject to DBO Contractor, extraction rate is yet to be defined, the final capacity of the turbine will depend on the Contractor's design
Re-cooling unit		sea water cooling	environmental sensitivity of coral reefs to be considered
APC system		Semi-Dry or dry system	final design subject to DBO Contractor meeting European emission standards is compulsory, minimising volume of residue
IBA processing		maturation, FE/NON-FE, crushing, screening	tradable volume subject to market
Residue landfill			
Total volume	m3	560,000	incl. base liner system or asphalt base and leachate collection system, for APC residues and non-marketable IBA (and other rejects)
No of cells		> 3	final design subject to DBO Contractor
Envisaged life time of landfill	years	> 15 years	subject to IBA recycling and marketing
Leachate treatment			
Treatment system		reverse osmosis	
Capacity	m3/d	120	expected throughput up to 55 m3/d (capacity reserve to cope with exceptional leachate volume due to weather conditions)
Brine disposal	m3/d	max. 14	via APC system of WtE

Also, the O&M shall be supervised on a daily basis by the Plant Manager who has more than 10 years of operation management experience at WtE facility. Engineering manager of primary technology provider and engineers of major equipment manufacturers shall be resident until performance of the WtE operation (8,000h/year).

(2) Evaluation Criteria

The Bid shall comprise two envelopes submitted simultaneously, one containing the Technical Bid and the other the Price Bid, both envelopes enclosed together in an outer single envelope. In the Technical Bids evaluation process, the Employer will carry out a detailed technical evaluation to determine whether the technical aspects are in compliance with the Bidding Document. The evaluation criteria are under development, which will be used by the Employer to examine and compare the technical aspects of the Bids on the basis of the information supplied by the Bidders, taking into account the following:

a) General aspects such as completeness of the proposals, the description of the EPC and project management, the health and security and environment management plan consideration, the preliminary operations and maintenance plan, their considerations towards disclosure of information to the public and etc;
b) The bidders' capabilities to mobilise the required sub-contractors, the necessary equipment and personnel that need to be specified accordingly;

c) The grate technology applied by the bidders must be a proven one, at least three years of successful operation;
d) Some aspects such as thickness of wear prone components are specified which the bidders have to comply with;
e) The potential energy output;
f) All performance guarantees must be met, such as 8,000 hours availability (needs to be proven), operations within the stoker capacity diagram meeting the specified steam temperature and pressure and the emission standards at the stack and for the effluent of the leachate treatment and etc;
g) Redundancy aspects, e.g. as for the cranes, for the boiler feed water supply, the cooling water supply etc.
h) Design criteria to be taken into account, amongst others, the expandability of the facility (a third line) which needs to be considered in the design of certain components and elements of the facility;
i) Compliance with standards;

The Bid that does not meet minimum and/or maximum acceptable standards of completeness, consistency, detail and performance guarantees, will be rejected for non-responsiveness;

Cost evaluation will be made on a life-cycle cost (LCC) basis, which means that both the initial cost, the operation and maintenance costs (variable and fixed costs) will be taken into account for evaluation. In addition to this, the incentive given to the contractor to generate electricity has to be taken into account. As the WtE facility will be producing a power surplus, for comparison reasons the overall energy sales which the Employer will accrue will be taken into consideration as well. In addition, if the bidder proposes to utilize the energy generated by the WtE to produce goods such as water as more reasonable and effective energy usage than the electricity for the grid, the revenue from the goods sale also can be taken into consideration when calculating the LCC. All costs and revenues during the O&M period will be discounted with an interest rate of 4% to get the net present value. The 4% were chosen to consider ADB's grant and both the concessional loan being provided by ADB and the more commercially oriented interest rates offered by AIIB and ISDB. Taking into account that an evaluation applying a low discount rate favors designs with high initial capex that can be operated at lower costs, which is in the interest of the Government of Maldives, the 4% are deemed reasonable.

Life Cycle Cost = Costs for the Design-Build + NPV(fixed O&M fee related the technology and technology provider) + NPV(variable O&M fee related the technology and technology provider) + (NPV(electricity incentive) + NPV(asset replacement costs) – NPV(electricity sales)) .

(3) Qualification Criteria

A pre-qualification process was conducted from May to August 2019, and shortlisted bidders will be invited to participate in the bidding process. The qualification of the bidders will be assessed with the following criteria (excerpt):

(a) Participation in at least two WtE DBO contracts (or similar long term BOT or PPP contracts) where design-build has been successfully or substantially completed within the last 10 years and that is similar to the proposed facilities, where the value of the Applicant's participation exceeds 75% of the total value of the reference contract (For

JV, all partners combined must meet requirement as follows: 1) either one partner must meet requirement, or 2) any to partners must each demonstrate one successfully or substantially completed contract of similar size and nature). The reference contracts shall comply with the following criteria:

- The minimum facility throughput capacity for each contract shall be 250 tons/day;
- The operating and maintenance period specified in the contract shall be ten years or more.

(b) Minimum average annual turnover of not less than $64 million within the last 3 years.

(c) Lead/managing partner for a Design-Build-Operate contract (or similar long term BOT/PPP contract) for waste to energy plant of at least 250 tons/day capacity, where the design-build has been successfully or substantially completed within the last ten years (For JV, one partner must meet requirements).

(d) O&M of a at least one waste to energy plants of at least 250 tons/day capacity (For JV, one partner must meet requirements). Each reference contract shall comply with the following criteria:

- The O&M component of the contract is either ongoing or was completed no more than five years ago;
- If the contract is ongoing, the contract has been running for two years or more;
- The O&M contract specifies an operating and maintenance period of ten years or more;
- The subject WtE facility has been operating successfully since commencement of the O&M contract, meeting the specified emission requirements.

The prime technology provider, including its consolidated subsidiaries, must have the experience of having completed at least three contracts of nature, size and complexity similar to the proposed (sub-)contract of WtE for municipal solid waste including design, engineering, procurement, manufacturing, transportation, installation and testing/commissioning. Each reference contract shall be for a plant with a capacity of at least 250 tons per day and under operation for more than 10 years. The prime technology provider shall also have one reference contracts outside the (sub-)contractor's home country. The prime technology provider shall have an experience of providing flue gas treatment process that complies with prescribed environmental standards of reference contract.

The Bid evaluation will be conducted by the Employer (Ministry of Environment, Maldives) and substantially supported by a team of international consultants including a DBO specialist, WtE mechanical engineer, a WtE O&M specialist and a WtE financial evaluation specialist.

6. If the specific provider and technology is identified, the spec of the technology

No specific provider and technology are identified.

7. Estimated reduction amount of CO_2 emission from energy sources by the advanced low carbon technology, energy efficiency improvement and/or renewable energy capacity installed and total reduction amount of GHG emission.

In accordance with the proposed outline of the methodology shown below in section II.9, the estimated emissions in tons of carbon dioxide equivalent are 592,796 tCO2e for 20 years as shown in Table 2 below. The process for its calculation can be found in the Annex IV: JCM

monitoring plan sheet, which is drafted based on the JMC_MM_AM001_ver01.0. https://www.jcm.go.jp/mm-jp/methodologies/75/monitoring_spreadsheet_file

Table 2. Estimated Emission Reductions from the WtE JCM Subcomponent

Year	Reference emissions		Project emissions		Emission reductions		Accumulated GHG ERs	
	GHG total	CO2 only	GHG total	CO2 only	GHG total	CO2 only	GHG total	CO2 only
Unit	tCO2e	tCO2	tCO2e	tCO2	tCO2e	tCO2	tCO2e	tCO2
2025	11213.3	11213.3	40033.5	34751.7	-28,820.2	-23,538.4	-28,820.2	-23,538.4
2026	24504.3	17292.2	40891.6	35550.3	-16,387.3	-18,258.1	-45,207.5	-41,796.5
2027	36407.2	23703.8	41775.4	36372.9	-5,368.2	-12,669.1	-50,575.7	-54,465.6
2028	47474.4	30458.9	42685.8	37220.2	4,788.6	-6,761.3	-45,787.1	-61,226.9
2029	58087.6	37571.8	43623.5	38092.8	14,464.1	-521.0	-31,323.0	-61,747.9
2030	68508.9	45054.7	44589.3	38991.6	23,919.6	6,063.1	-7,403.4	-55,684.8
2031	78922.5	52921.4	45584.1	39917.5	33,338.4	13,003.9	25,935.0	-42,680.9
2032	81248.0	52974.0	45471.8	39813.0	35,776.2	13,161.0	61,711.2	-29,519.9
2033	83140.7	53006.4	45343.9	39693.9	37,796.8	13,312.5	99,508.0	-16,207.4
2034	84725.3	53038.1	45216.2	39575.1	39,509.1	13,463.0	139,017.1	-2,744.4
2035	86078.3	53069.8	45089.0	39456.8	40,989.3	13,613.0	180,006.4	10,868.6
2036	87253.2	53101.4	44962.4	39338.9	42,290.8	13,762.5	222,297.2	24,631.1
2037	88287.1	53132.4	44835.8	39221.1	43,451.3	13,911.3	265,748.5	38,542.4
2038	89208.0	53163.4	44709.9	39103.9	44,498.1	14,059.5	310,246.6	52,601.9
2039	90035.8	53194.3	44584.1	38986.8	45,451.7	14,207.5	355,698.3	66,809.4
2040	90784.6	53224.6	44458.7	38870.1	46,325.9	14,354.5	402,024.2	81,163.9
2041	91466.3	53254.8	44333.9	38754.9	47,132.4	14,499.9	449,156.6	95,663.8
2042	92089.1	53284.3	44209.4	38638.1	47,879.7	14,646.2	497,036.3	110,310.0
**2043	92089.1	53284.3	44209.4	38638.1	47,879.7	14,646.2	544,916.0	124,956.2
**2044	92089.1	53284.3	44209.4	38638.1	47,879.7	14,646.2	592,795.7	139,602.4
Total	1,473,612.8	909,228.2	880,817.1	769,625.8	592,796	139,602		

** The values of 2042 are used for 2043 and 2044 because the JCM_MM_AM_001 can only calculate the values for 18 years. This is considered conservative as the actual values (emission reductions) in 2043 and 2044 are estimated higher than in 2042.

For the scenario analysis to calculate the emission reductions above, the following data on the waste incinerated and net energy outputs were assumed.

Table 3: Waste to be incinerated and net energy output (incl. baled waste)

	Waste Incinerated (t)	Net Energy Output (MWh)
2025	143,600	15,574
2026	146,900	24,017
2027	150,299	32,922
2028	153,800	42,304
2029	157,406	52,183
2030	161,120	62,576
2031	164,946	73,502
2032	164,514	73,575
2033	164,022	73,620
2034	163,531	73,664
2035	163,042	73,708

2036	162,555	73,752
2037	162,068	73,795
2038	161,584	73,838
2039	161,100	73,881
2040	160,618	73,923
2041	160,138	73,965
2042	159,659	74,006
2043	159,181	74,047
2044	158,705	74,088

As stated in the section II.1 above, the proposed 500 tons/day plant can deal with the waste growth in the Greater Male region up to 2038. While it is planned to install additional treatment line to meet the growing waste management requirement in 2039, the above data does not include the additional line for the purpose of fairly calculating the energy output and GHG emission reductions materialized by the JFJCM grant.

For the first 3 years (2025-2027), the annual GHG emission reductions are expected to be negative (increase) due to small contribution of methane emission reductions and low energy surplus fed into the grid. It is suggested to wait issuance of the JCM credits until the total negative emission reductions are offset by the positive emission reductions achieved in subsequent years, which will be in 2031. This approach is taken in one of the approved methodologies under the CDM (para 109 of ACM0022 "Alternative waste treatment processes" Ver. 02.0):

> *"In the case that overall negative emission reductions arise in a year, CERs are not issued to project participants for the year concerned and in subsequent years, until emission reductions from subsequent years have compensated the quantity of negative emission reductions from the year concerned. (For example: if negative emission reductions of 30 t CO2e occur in the year y and positive emission reductions of 100 t CO2e occur in the year y+1, 0 CERs are issued for year y and only 70 CERs are issued for the year y+1.)"*

Meanwhile, the project aims to make the emission reductions materialized earlier than 2030 by several measures, such as 1) increasing net energy output by the plant (increasing the demand) during the first six years (2025-30), which will replace diesel generation, 2) considering to incinerate the waste to be collected from other islands in the adjacent zones (outside zone 3), and 3) refining the parameters within the methodology based on the local conditions.

8. Co-benefit of the environment and region
   (Describe the reduction of environmental pollution, including air or water pollution, solid waste treatment or conservation of natural resources, and/or (b) other social economic benefits, including increased job creation opportunities and better access to basic infrastructures)

The Project will bring significant environmental, social and economic co-benefits.

(a) Reduction of the MSW directly disposed in the landfill site will result in
   a. improved health of the residents by minimising the odour and smoke from spontaneous combustion;
   b. improved marine ecosystem by minimising the waste dumping to the ocean;

c. expanded lifetime of the landfill site (minimised waste volume to be delivered to the landfill).

(b) Reduction of diesel oil use will result in improved energy security and trade balance of the government as the Maldives heavily depends on diesel for power generation, which is entirely imported.

9. The applied JCM MRV methodology (If not existing, the rough proposal of JCM methodology)

The methodology to be applied for the Project will be considered based on the approved methodology: JCM_MM_AM001_ver01.0 (Power generation and avoidance of landfill gas emissions through combustion of municipal solid waste (MSW)).

(1) Title of the methodology:

Power generation and avoidance of landfill gas emissions through combustion of municipal solid waste (MSW)

(2) Summary of the Methodology

(i) GHG emission reduction measures:

(a) Installation of MSW incinerators avoids emissions of methane associated with disposed organic waste in a solid waste disposal site (SWDS);
(b) Electricity generated by the project facility displaces electricity from a grid or captive power generator which is generated using fossil fuels resulting in GHG emission reductions.

(ii) Reference emissions: Reference emissions are calculated as a sum of the following emissions:

(a) CH_4 emissions from SWDS: Calculated from the amount of MSW and fraction of each waste type incinerated in the incinerator using the first order decay (FOD) model; and
(b) CO_2 emissions from a grid or captive power generator: Electricity fed into the grid by the project facility multiplied by the emission factor of displaced electricity.

(iii) Project emissions: Project emissions are calculated as a sum of the following emissions:

(a) CO_2 emissions from combustion of fossil carbon contained in MSW: The amount of MSW multiplied by the fraction of fossil carbon content and the conversion factor of carbon;
(b) N_2O emissions from combustion of waste: The amount of MSW multiplied by the N_2O emission factor associated with incineration;
(c) CO_2 emissions from electricity used to operate the project facility: Electricity used to operate the project facility multiplied by the emission factor of electricity; and
(d) CO_2 emissions from auxiliary fossil fuel consumption associated with incineration: The amount of fossil fuel consumption associated with incineration multiplied by the emission factor of the fossil fuel.

(iv) Monitoring parameters:

(a) Quantity of MSW fed into incinerator (wet basis);
(b) Quantity of electricity generated by the project facility;
(c) Quantity of electricity consumed by the project facility; and

(d) Quantity of auxiliary fossil fuel consumed.

(3) Eligibility criteria

This methodology is applicable to projects that satisfy all of the following criteria.

Criterion 1	The project newly installs an incinerator, waste heat recovery boiler, exhaust gas treatment equipment and turbine generator.
Criterion 2	The project incinerates municipal solid waste (MSW) which has been disposed at a SWDS where the generated landfill gas is not recovered, and generates electricity from steam produced in waste heat recovery boiler.
Criterion 3	There is a plan to operate the project facility for more than 5 years.

(4) Reference scenario

A project which applies this methodology incinerates MSW and generates electricity. In Maldives, MSW is usually disposed in open dump sites without recovering landfill gas. Although some initiatives exist to treat waste with alternative methods such as incinerating MSW, the cost of alternative treatment of waste hampers its installation. Therefore, without the financial assistance the alternative waste treatment facility would not be bankable. As a result, BaU for MSW treatment is open dumping and setting fire to the waste and BaU emissions are CH_4 emissions from decomposition of MSW at a SWDS and CO_2 emissions from fossil fuels combusted to generate electricity which would be displaced by the project. CH_4 emissions from decomposition of MSW at a SWDS are calculated based on a first order decay (FOD) model.

To assure net emission reductions, the model correction factor which accounts for uncertainty of the model to calculate emissions from decomposition of MSW is set conservatively. Therefore, the reference emissions are a summation of conservative CH_4 emissions from decomposition of MSW at a SWDS and CO_2 emissions from fossil fuels combusted to generate electricity which would be displaced by the project.

(5) Calculation formulas

(i) Calculation of reference emissions:

$$\mathrm{RE_p} = \mathrm{RE_{CH4,p}} + \mathrm{RE_{elec,p}}$$

Where:

$\mathrm{RE_p}$ = Reference emissions during the period *p* [tCO_2e/p]

$\mathrm{RE_{CH4,p}}$ = Reference emissions from decomposition of MSW at a SWDS during the period *p* [tCO_2e/p]

$\mathrm{RE_{elec,p}}$ = Reference emissions from electricity generation during the period *p* [tCO_2e/p]

Reference emissions from decomposition of MSW at a SWDS during the period *p* ($RE_{CH4,p}$) is accounted only from the next calendar year after its disposal at a SWDS (or incineration) due to delay in generation of CH_4 from the time of disposal at a SWDS.

$$RE_{CH4,p} = \sum_{y=p\_start}^{p\_end} \left[\varphi \times (1-f) \times GWP_{CH4} \times (1-OX) \times \frac{16}{12} \times F \times DOC_f \times MCF \times \sum_{i=1}^{y-1} \sum_{j} \left\{ W_i \times P_j \times DOC_j \times e^{-k_j(y-1-i)} \times \left(1 - e^{-k_j}\right) \right\} \right]$$

Where:

$RE_{CH4,p}$	=	Reference emissions from decomposition of MSW at a SWDS during the period *p* [tCO_2e/p]
y	=	The N^{th} year from the first disposal (or incineration), extending from the first year of the period *p* (*y*=*p_start*) to the last year of the period *p* (*y*=*p_end*). If *y* is equal to 1, methane generation cannot be accounted.
p_start	=	The N^{th} year from the first disposal (or incineration), which is the first year of the period *p*
p_end	=	The N^{th} year from the first disposal (or incineration), which is the last year of the period *p*
φ	=	Model correction factor to account for model uncertainties
f	=	Fraction of methane captured at a SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere
GWP_{CH4}	=	Global Warming Potential of methane [tCO_2e/tCH_4]
OX	=	Oxidation factor (reflecting the amount of methane from a SWDS that is oxidized in the soil or other material covering the waste)
$\frac{16}{12}$	=	Conversion factor [tCH_4/tC]
F	=	Fraction of methane in the SWDS gas [volume fraction]
DOC_f	=	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in a SWDS [weight fraction]
MCF	=	Methane correction factor
i	=	The N^{th} year from the first disposal (or incineration), extending from the first year in the time period in which MSW is disposed at a SWDS (*i* = 1) to year *y* (*i* = *y*)
W_i	=	Quantity of MSW fed into incinerator in the year *i* (wet basis) [t]
P_j	=	Fraction of the waste type *j* [weight fraction]
DOC_j	=	Fraction of degradable organic carbon in the waste type *j* [weight fraction]
k_j	=	Decay rate for the waste type *j* [1/yr]
j	=	Type of waste

$$RE_{elec,p} = EG_{elec,p} \times EF_{elec}$$

Where:

$RE_{elec,p}$	=	Reference emissions from electricity generation during the period *p* [tCO_2e/p]
$EG_{elec,p}$	=	Quantity of electricity generated by the project facility during the period *p* [MWh/p]
EF_{elec}	=	Emission factor for electricity generation [tCO_2e/MWh]

(ii) Calculation of project emissions

$$PE_p = PE_{COM\_CO2,p} + PE_{COM\_N2O,p} + PE_{EC,p} + PE_{FC,p}$$

Where:

PE_p	=	Project emissions during the period *p* [tCO_2e/p]

$PE_{COM\_CO2,p}$ = Project emissions of CO_2 from combustion of fossil carbon contained in waste associated with incineration during the period *p* [tCO_2e/p]

$PE_{COM\_N2O,p}$ = Project emissions of N_2O from combustion of waste associated with incineration during the period *p* [tCO_2e/p]

$PE_{EC,p}$ = Project emissions from electricity consumption by the project facility during the period *p* [tCO_2e/p]

$PE_{FC,p}$ = Project emissions from auxiliary fossil fuel consumption associated with incineration during the period *p* [tCO_2e/p]

$$PE_{COM\_CO2,p} = EFF_{COM} \times \frac{44}{12} \times \sum_{j} \left(\sum_{i=p\_start}^{p\_end} W_i \times P_j \times \frac{DC}{100} \times FCC_j \times FFC_j \right)$$

Where:

$PE_{COM\_CO2,p}$ = Project emissions of CO_2 from combustion of fossil carbon contained in waste associated with incineration during the period *p* [tCO_2e/p]

EFF_{COM} = Combustion efficiency of incinerator [fraction]

$\frac{44}{12}$ = Conversion factor [tCO_2/tC]

i = The N^{th} year from the first incineration

p_start = The N^{th} year from the first incineration, which is the first year of the period *p*

p_end = The N^{th} year from the first incineration, which is the last year of the period *p*

W_i = Quantity of MSW fed into incinerator in the year *i* (wet basis) [t]

P_j = Fraction of the waste type *j* [weight fraction]

DC = Dry matter content of MSW [%]

FCC_j = Fraction of total carbon content in waste type *j* [tC/t]

FFC_j = Fraction of fossil carbon in total carbon content of waste type *j* [weight fraction]

j = Type of waste

$$PE_{COM\_N2O,p} = \sum_{i=p\_start}^{p\_end} W_i \times EF_{N2O} \times GWP_{N2O}$$

Where:

$PE_{COM\_N2O,p}$ = Project emissions of N_2O from combustion of waste associated with incineration during the period *p* [tCO_2e/p]

i = The N^{th} year from the first incineration

p_start = The N^{th} year from the first incineration, which is the first year of the period *p*

p_end = The N^{th} year from the first incineration, which is the last year of the period *p*

W_i = Quantity of MSW fed into incinerator in the year *i* (wet basis) [t]

EF_{N2O} = Emission factor for N_2O associated with incineration [tN_2O/t waste]

GWP_{N2O} = Global Warming Potential of nitrous oxide [tCO_2e/tN_2O]

$$PE_{EC,p} = EC_p \times EF_{elec}$$

Where:

$PE_{EC,p}$ = Project emissions from electricity consumption by the project facility during the period *p* [tCO_2e/p]

EC_p = Quantity of electricity consumed by the project facility during the period *p* [MWh/p]

EF_{elec} = Emission factor for electricity generation [tCO_2e/MWh]

$$PE_{FC,p} = \sum_{fuel} \left(FC_{fuel,p} \times NCV_{fuel} \times EF_{CO2,fuel} \right)$$

Where:

$PE_{FC,p}$	=	Project emissions from auxiliary fossil fuel consumption associated with incineration during the period *p* [tCO_2e/p]
$FC_{fuel,p}$	=	Quantity of auxiliary fossil fuel consumed during the period *p* [kL or m^3/p]
NCV_{fuel}	=	Net calorific value of fuel [GJ/kL or m^3]
$EF_{CO2,fuel}$	=	CO_2 emission factor of fuel [tCO_2/GJ]
$fuel$	=	Type of fuel

(iii) Calculation of emissions reductions

$$ER_p = RE_p - PE_p$$

Where:

ER_p	=	Emission reductions during the period *p* [tCO_2e/p]
RE_p	=	Reference emissions during the period *p* [tCO_2e/p]
PE_p	=	Project emissions during the period *p* [tCO_2e/p]

Details of the data and parameters fixed ex ante and to be monitored or calculated ex post, with the assumption used for calculating emission reductions in the section 7, are summarized in the Annex III.

10. The Schedule of JCM application (Month and Year)

Draft of JCM methodology	September 2023
Preparation of Project Design Document (PDD)	March 2024
Validation of PDD	May 2024
Submission of PDD to the Joint Committee	July 2024
Monitoring	January 2025– December 2031 (This is the period required for the emission reductions to become positive)
Verification of the monitoring	February 2032

III. Incremental costs of the adoption of the advanced low carbon technologies (amount of grant requested from JFJCM)

(Note: JFJCM requires incremental cost calculations, comparing the “business as usual” option vs. the “more advanced low carbon” option.)

In Maldives, MSW is usually disposed in open dump sites. The key challenge of introducing advanced WtE is its high initial investment required, and without external assistance, such advanced WtE will not be installed. Given the classification of Maldives assessed by the IMF as high risk of the distress, the most concessional financing option through the JFJCM grant (in

conjunction with the ADB grant and concessional loan) is necessary to ensure the bankability of the project. Therefore, the proposed WtE as a whole is considered as incremental. According to the government consultants preparing DBO, the preliminary cost estimate for the WtE subcomponent (incl. the residue landfill) is $95.8 million (base costs plus taxes), and $10 million is requested from the JFJCM.

IV. Cost estimation table of Grant and loan (only component which will be supported by the fund)

Category	Amount of Grant Allocated in $ million	Amount of loan or other sources in $ million
1. Waste to Energy facility	9.5	86.3
2. Technical, procurement, supervision, and planning support	0.5	5.0
a. Basic design, tender assistance (bid document, bid evaluation, and contract negotiation), and construction supervision including safeguard monitoring	0.0	5.0
b. JCM related operational expenses (methodology and project design document preparation, auditing firm for validation and verification)	0.5	0
TOTAL	**10.0**	**91.3**

V. The following are attached for more details:

Annex I - Design and Monitoring Framework

Annex II - Project Concept Paper

Annex III - Data and parameters fixed ex ante and to be monitored or calculated ex post for the proposed JCM methodology

Annex IV – Draft JCM monitoring plan sheet (for calculating GHG emission reductions)

Annex III: Data and parameters fixed ex ante and to be monitored or calculated ex post for the proposed JCM methodology

(a) Data and parameters fixed *ex ante*

Parameter	Description of data	Source
φ	Model correction factor to account for model uncertainties Default value: 0.80 The conservative value was selected from the default values $\varphi_{default}$ in the tool.	CDM Methodological Tool "Emissions from solid waste disposal sites" (Version 07.0)
f	Fraction of methane captured at a SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere Default value: 0	Decided taking into consideration the situation in Maldives
GWP_{CH4}	Global Warming Potential of methane [tCO_2e/tCH_4] Default value: 25	Table 2.14, of the errata to the contribution of Working Group I to the Fourth Assessment Report of the IPCC
OX	Oxidation factor (reflecting the amount of methane from a SWDS that is oxidized in the soil or other material covering the waste) Default value: 0.1	CDM Methodological Tool "Emissions from solid waste disposal sites" (Version 07.0)
F	Fraction of methane in the SWDS gas [volume fraction] Default value: 0.5	CDM Methodological Tool "Emissions from solid waste disposal sites" (Version 07.0)
DOC_f	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in a SWDS [weight fraction] Default value: 0.5	CDM Methodological Tool "Emissions from solid waste disposal sites" (Version 07.0)
MCF	Methane correction factor: No water table above the bottom of the SWDS. 0.3 is selected as the	CDM Methodological Tool "Emissions from solid

	landfill is constantly smoldering and fires are set deliberately. Select one of the followings taking into consideration the situation of the project. (1) In case of a water table above the bottom of the SWDS, estimate the MCF using the following equation. $$MCF = MAX\left\{\left(1 - \frac{2}{d_y}\right), \frac{h_{w,y}}{d_y}\right\}$$ $h_{w,y}$ = Height of water table measured from the base of the SWDS [m] d_y = Depth of the SWDS [m] (2) In case that the SWDS does not have a water table above the bottom of the SWDS, select the applicable value from the following: ● 1.0 for anaerobic managed solid waste disposal sites. These have controlled placement of waste (i.e. waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and will include at least one of the following: (i) cover material; (ii) mechanical compacting; or (iii) leveling of the waste; ● 0.5 for semi-aerobic managed solid waste disposal sites. These have controlled placement of waste and will include all of the following structures for introducing air to the waste layers: (i) permeable cover material; (ii) leachate drainage system; (iii) regulating pondage; and (iv) gas ventilation system; ● 0.8 for unmanaged solid waste disposal sites– deep. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of greater than or equal to 5 meters; ● 0.4 for unmanaged-shallow solid waste disposal sites or stockpiles that are considered SWDS. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of less than 5 meters. This includes stockpiles of solid waste that are considered SWDS. ● 0.3 for the given situation that the current	waste disposal sites" (Version 07.0)

<table>
<tr><td></td><td>operator constantly set fire to the dumped waste.</td><td></td></tr>
<tr><td>DOC_j</td><td>Fraction of degradable organic carbon in the waste type j [weight fraction]

Default values for DOC_j:

<table><tr><th>Waste type j</th><th>DOC_j [% of wet waste]</th></tr><tr><td>Wood and wood products</td><td>43</td></tr><tr><td>Pulp, paper and cardboard (other than sludge)</td><td>40</td></tr><tr><td>Food, food waste, beverages and tobacco (other than sludge)</td><td>15</td></tr><tr><td>Textiles</td><td>24</td></tr><tr><td>Garden, yard and park waste</td><td>20</td></tr><tr><td>Nappies</td><td>24</td></tr><tr><td>Glass, plastic, metal, other inert waste</td><td>0</td></tr></table></td><td>CDM Methodological Tool “Emissions from solid waste disposal sites” (Version 07.0) and Table 2.4, chapter 2, volume 5 of 2006 IPCC guidelines for National GHG Inventories</td></tr>
<tr><td>k_j</td><td>Decay rate for the waste type j [1/yr]

Default values for k_j:

<table><tr><th colspan="2">Waste type j</th><th>k_j [1/yr]</th></tr><tr><td rowspan="2">Slowly degrading</td><td>Pulp, paper, cardboard (other than sludge), textiles</td><td>0.07</td></tr><tr><td>Wood, wood products and straw</td><td>0.035</td></tr><tr><td>Moderately degrading</td><td>Other (nonfood) organic putrescible garden and park waste</td><td>0.17</td></tr><tr><td>Rapidly degrading</td><td>Food, food waste, sewage sludge, beverages and tobacco</td><td>0.40</td></tr></table>The default values k_j for Tropical (Mean annual temperature>20 degree C) and Wet (Mean annual precipitation>1000mm) were selected taking into consideration the climate condition of Maldives.</td><td>CDM Methodological Tool “Emissions from solid waste disposal sites” (Version 08.0)</td></tr>
</table>

<table>
<tr>
<td>P_j</td>
<td>Fraction of the waste type j [weight fraction]

Before the validation of a proposed project, take at least one sample in each season (both rainy and dry) from MSW transported to a SWDS within the same municipality where the project facility is to be constructed, weigh each waste fraction (measure on wet basis) taking into consideration the waste type j, as provided in the tables for FCC_j and FFC_j, and average each waste fraction j among the samples.</td>
<td>Study conducted by the project participants</td>
</tr>
<tr>
<td>EF_{elec}</td>
<td>Emission factor for electricity generation [tCO_2e/MWh]

The emission factor has been set to 0.72t CO_2/MWh referring to the Maldives Low Carbon Development Strategy http://orbit.dtu.dk/files/96933631/LCDS_report_final_June_2014.pdf</td>
<td>For grid electricity: PDD of the most recently registered CDM project hosted in Maldives or the latest version of the “Tool to calculate the emission factor for an electricity system” under the CDM at the time of validation

For captive electricity: CDM approved small scale methodology AMS-I.A.</td>
</tr>
<tr>
<td>EFF_{COM}</td>
<td>Combustion efficiency of incinerator [fraction]
Default value: 1 (100%)</td>
<td>Table 5.2, chapter 5, volume 5 of 2006 IPCC guidelines for National GHG Inventories</td>
</tr>
<tr>
<td>FCC_j</td>
<td>Fraction of total carbon content in waste type j [tC/t]

Default values for FCC_j:

<table>
<tr><th>Waste type j</th><th>FCC_j
[% of dry weight]</th></tr>
<tr><td>Paper/cardboard</td><td>50</td></tr>
<tr><td>Textiles</td><td>50</td></tr>
<tr><td>Food waste</td><td>50</td></tr>
<tr><td>Wood</td><td>54</td></tr>
<tr><td>Garden and Park waste</td><td>55</td></tr>
<tr><td>Nappies</td><td>90</td></tr>
<tr><td>Rubber and Leather</td><td>67</td></tr>
</table>
</td>
<td>CDM approved consolidated baseline and monitoring methodology ACM0022 “Alternative waste treatment processes” (Version 02.0)</td>
</tr>
</table>

<table>
<tr><td></td><td><table>
<tr><td>Plastics</td><td>85</td></tr>
<tr><td>Metal*</td><td>NA</td></tr>
<tr><td>Glass*</td><td>NA</td></tr>
<tr><td>Other, inert waste</td><td>5</td></tr>
</table>
*Metal and glass contain some carbon of fossil origin. Combustion of significant amounts of glass or metal is not common.</td><td></td></tr>
<tr><td>FFC_j</td><td>Fraction of fossil carbon in total carbon content of waste type j [weight fraction]

Default values for FFC_j:

<table>
<tr><td>Waste type j</td><td>FFC_j (%)</td></tr>
<tr><td>Paper/cardboard</td><td>5</td></tr>
<tr><td>Textiles</td><td>50</td></tr>
<tr><td>Food waste</td><td>-</td></tr>
<tr><td>Wood</td><td>-</td></tr>
<tr><td>Garden and Park waste</td><td>0</td></tr>
<tr><td>Nappies</td><td>10</td></tr>
<tr><td>Rubber and Leather</td><td>20</td></tr>
<tr><td>Plastics</td><td>100</td></tr>
<tr><td>Metal*</td><td>NA</td></tr>
<tr><td>Glass*</td><td>NA</td></tr>
<tr><td>Other, inert waste</td><td>100</td></tr>
</table>
*Metal and glass contain some carbon of fossil origin. Combustion of significant amounts of glass or metal is not common.</td><td>CDM approved consolidated baseline and monitoring methodology ACM0022 “Alternative waste treatment processes” (Version 02.0)</td></tr>
<tr><td>DC</td><td>Dry matter content of MSW [%]

Before the validation of a proposed project, take at least one sample in each season (both rainy and dry) from MSW transported to a SWDS within the same municipality where the project facility is to be constructed, weigh each sample in wet and dry basis, calculate the fraction of dry matter content for each sample, and average the values obtained.

The dry matter content of the MSW is 65% based on the feasibility study.</td><td>Study conducted by the project participants</td></tr>
<tr><td>EF_{N2O}</td><td>Emission factor for N_2O associated with incineration [tN_2O/t waste]</td><td>CDM approved consolidated baseline and monitoring methodology</td></tr>
</table>

<table>
<tr><td></td><td>Select one of the following default values taking into consideration the situation of the project.

Default values for EF_{N2O}:

<table><tr><th>Type of waste</th><th>Technology / Management practice</th><th>EF_{N2O} [tN_2O/t waste wet basis]</th></tr><tr><td>MSW</td><td>Continuous and semicontinuous incinerators</td><td>$1.21*50*10^{-6}$</td></tr><tr><td>MSW</td><td>Batch-type incinerators</td><td>$1.21*60*10^{-6}$</td></tr></table></td><td>ACM0022 “Alternative waste treatment processes” (Version 02.0) and Table 5.6, chapter 5, volume 5 of 2006 IPCC Guidelines for National GHG Inventories</td></tr>
<tr><td>GWP_{N2O}</td><td>Global Warming Potential of nitrous oxide [tCO_2e/tN_2O]

Default value: 298</td><td>Table 2.14, of the errata to the contribution of Working Group I to the Fourth Assessment Report of the IPCC</td></tr>
<tr><td>NCV_{fuel}</td><td>Net calorific value of fuel [GJ/kL or m^3]

Decide from the specifications described on invoices or other commercial/contractual evidence.

36 GJ/m^3 (fossil fuel/diesel)</td><td>Invoices or other commercial/contractual evidence</td></tr>
<tr><td>$EF_{CO2,fuel}$</td><td>CO_2 emission factor of fuel [tCO_2/GJ]

Select a value for the fuel combusted by the project from the IPCC default values at the upper limit of the uncertainty at a 95% confidence interval.

0.0748: Selected the value for diesel at the upper limit of the uncertainty at a 95% confidence interval from the IPCC</td><td>Table 1.4, chapter 1, volume 2 of 2006 IPCC Guidelines for National GHG Inventories. Upper value is applied.</td></tr>
</table>

(b) Parameters to be monitored or calculated *ex post*:

Parameters	Description of data
W_i	Quantity of MSW fed into incinerator in the year *i* (wet basis) [t] See the Table 3 in JFJCM application

p_start	The N^{th} year from the first disposal (or incineration), which is the first year of the period *p*
p_end	The N^{th} year from the first disposal (or incineration), which is the last year of the period *p*
$EG_{elec,p}$	Quantity of electricity generated by the project facility during the period *p* [MWh/p] See the Table 3 in JFJCM application
EC_p	Quantity of electricity consumed by the project facility during the period *p* [MWh/p] Has been set to 0, as the facility is always able to generate the electricity for self-consumption.
$FC_{fuel,p}$	Quantity of auxiliary fossil fuel consumed during the period *p* [kL or m^3/p] 18,000 m3/18 years The estimation was made based on the following: a) The facility has an envisaged down time of 2 lines per year of one week, having a demand during this period of around 1.5 MW, i.e. 250 MWh during the entire 7 days. Assuming another one week due to unforeseen incidents and assuming a genset efficiency of 30%, the overall diesel consumption is around 170 m^3/year (NCV of diesel 10 MWh/m3). b) Furthermore, to heat up the processing lines after a down time, between 2 and 3 litter fuel oil or diesel/ton MSW incinerated are required usually, hence, between 330 and 500 m3/year additionally. c) While it is 670m3/year in total as calculated above, 1,000 m3/year is assigned to make it conservative. Hence, the overall auxiliary fuel consumption over 18 years would be 18,000 m3.

Minutes of Stakeholders Consultations

Minutes of the
Stakeholder meeting for development of the EIA for the Regional Waste Management Facility at Zone 3 in Thilafushi

Venue: Auditorium, Ministry of Environment
Date: 20th September 2018
Time: 9:00

The stakeholders for the establishment of the Regional Waste Management Facility at Thilafushi was held at Ministry of Environment and Energy on 20th September 2018. The meeting was organized by Ministry of Environment for a request by Water Solutions Pvt Ltd as the EIA consultant for the project.

The meeting was initiated by an introduction of the project by a brief introduction to the project by the project management team at the Ministry of Environment. They highlighted that ADB is financing the project in association with International Partners. Then Consultant for the project provided a detail outline of the project and the EIA Consultant provided the details of the EIA work that has been carried out as part of the project.

Mr. Kasdarli Chakir, Engineer, KOCKS CONSULT GMBH, provided a very detail outline of the proposed regional waste management facility development project for Zone III at Thilfushi. The detail account of the project included the proposed harbour rehabilitation component of the project to improve the waste acceptance area at Thilfushi, existing dumpsite rehabilitation component and the main Waste to Energy Facility component that is referred as the Regional Waste Management Facility for Zone III at Thilhafushi.

Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided an outline of the work that had been carried out as part of the EIA for the project. He highlighted that Water Solutions is undertaking a "hot water dispersion modelling work" to study the impacts of the hot water that would be discharged into the marine environment from the waste to energy plant. A dispersion modelling was done to study the stack height and the impacts of emission from the stack on the surrounding areas of Thilafushi. A geophysical study was carry out to determine the thickness of the waste that has been buried out at the landfill at Thilafushi. The consultant outlined that groundwater and marine water would be studied to establish the baseline at the proposed project site.

Aima, Engineer from GMIZ informed, GMIZ has plans to construct a new road from the periphery (southern side) of the newly reclaimed area at Thilfushi. This is to facilitate the ease of transportation between the eastern and western side of the halves of the island as the existing road that has been build is not expected to meet traffic demand that is expected in the future and establishment of the industries at Thilhafushi. However, Aiman, noted that it is just an idea that they are exploring and it has not developed into an advance stage of planning.

In reply, Chakir mentioned that the boundary of the reclaimed land is not confirmed and therefore it is difficult to see if land could be allocated for a new road. Chakir also mentioned that the proposition for this new roads shall be cleared before the procurement or any further steps. Furthermore, Chakir mentioned that ADB suggests a buffer zone for better coastal management.

Mr. Zameel from PMU suggested to have a policy level meeting to make final decision about the new road.

Mr. Ahmed Afrah Ismail EPA raised the issue of ownership of the energy that would be produced from the WTE (Waste to Energy Facility) and other valuable by products.

Chakir replied that the ownership and responsibility of the products from WTE has not been decided. This includes energy from waste to energy, metals and bottom ash. Excess energy will be converted into hot water and discharge to the sea. A business model shall be made to determine a percentage profit for the operators.

EPA also asked if it would be feasible for the operators to run without selling the energy produced.

Chakir replied that WAMCO will establish a tariff system. Operators will charge a gate fee as well. Taxpayers will have to subsidize the burning of waste.

In reply to EPA's question regarding the air pollution control for the system, Chakir provided details of the project stating that it would be the contractor's responsibility and obligation. There will live monitoring and external controls to ensure that air pollution from the stack is within the acceptable range. EPA should also have access to this data and shall be able to run individual assessments. The facility owner is MEE and as EPA is under MEE, EPA has a right to monitor and conduct regular monitoring. Operator will have to maintain emissions under international standards and currently there are no local air quality standards.

Ms Shaahina Ali from Parley highlighted that the proposed regional waste management facility is based on incineration. Sorting and segregation is not in the part of the entire waste management system, especially as this has started from collection, transfer and incineration. EPA also mentioned that they plan to start segregation of waste, however it discourage the citizens to segregate even in 15 years if the government plans to incinerate all the waste. They suggested that government should encourage waste reduction and sorting, either from a centralized or a decentralized system.

WAMCO replied saying that a sorting facility cannot be accommodated in the Male' transfer station and there will be a civic amenity facility at Hulhumale' where people can bring in their sorted waste.

Concerns were raised if all waste materials will be bailed if the WTE is down, to which Chakir replied that there is bunker with a capacity of 6 days. There is also a second line of at WTE, so there will not be complete shutdown of the system. He also added that a third line is foreseen in 15 years as the waste generation is expected to increase to 700 tonnes per day.

Moosa Haneef from HPA mentioned that the healthcare waste is not pretreated and if the waste management system can incinerate this waste at the waste management facility. EPA also inquired whether the proposed facility could incinerate hazardous waste. It was noted from the consultant that waste to energy plant can manage small quantity of the waste. However batteries should not be incinerated. Chakir replied that the 5 small incinerators were specially designed for healthcare waste.

WAMCO – can incinerator take large aluminum? Yes, there will be magnets and sieving.

EPA questioned when the open burning will stop in Thliafushi, to which the project manager replied that it will be done after obtaining the required machinery such as excavators and bulldozers.

Parley for the Oceans asked if the Male' Waste Transfer facility is under this project to which Chakir replied that it is, and so is Villingili and Hulhumale' Transfer Station. Parley inquired whether the facility could incinerate used tires. The consultant noted that the tires are high calorific value item that can be incinerated.

EPA asked of the capacity of the incinerator was designed for and if the design foresees a decrease in waste generation. The concept of the project does not seem to focus on waste reduction but the opposite. Chakir mentioned that this was the best feasible option for management waste that is generated in Zone III. Waste generation of 400tonnes per day without CnD waste is expected for 2022. Waste is also expected to increase from the tourism industry and after the airport development project is completed. There needs to be policy level changes to incorporate and implement sorting and waste reduction, such has less packaging. The proposed method is a safe treatment that technical and realistic.

GMIZ question about the kind of traffic that is expected after the project. Chakir replied that not much increase is expected. For the island connections, 2 to 3 vessels are expected to increase. Sometimes resorts bring in waste from the isalnds.

EPA noted that incineration should be the last option to consider after sorting, composting and pyrolysis. WS and KOCKS suggested sorting with colored plastic bags but was not considered due to management issues. Germany has been doing this and they have 70% sorting after 30 years of awareness.

Currently there is no hazard waste management but there should be.

Attendance

Following officials attended the stakeholder meeting that was held at Ministry of Environment and Energy

Name	Title	Organization / Address	Contact
Mohamed Hamdhaan	Assistant Project Coordinator	Ministry of Environment and Energy	7681878
Ibrahim Zameel	Project Manager	Ministry of Environment and Energy	7794959
Aminath Maleeha Sollih	Procurement Specialist	Ministry of Environment and Energy	7931645
nafha.aujaz	Environment Analyst	Ministry of Housing and Infrastructure	3004110
Aishath Bariya	Engineer	Ministry of Housing and Infrastructure	3004110
Moosa Haneef	SDHPO	Health Protection Agency	7423180
Ismail Ubaidh	CS Manager	WAMCO	7931008
Ahmed Shafiu	BD & Marketing	WAMCO	7698899
Aminath Nazra	Project Officer	Save the Beach	7620044
Aminath Mohamed	Environment Analyst	Environment Protection Agency	7504494
Shaahina Ali	Executive Director	Parley for the Oceans	7771341
Ahmed Afrah Ismail	Engineer	Environment Protection Agency	9690600
Aiman	Engineer	Greater Male' Industrial Zone	7236734
Ahmed Jameel	Environment Consultant	Water Solution	7785379
Nashfa Nashidh	Junior Environmental Consultant	Water Solution	9533094
Kasdarli Chakir	Engineer	KOCKS CONSULT GMBH	+49 261 1302 112

Photos from the Stakeholder Meeting

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Ministry of Environment
Male', Republic of Maldives.

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Minutes of the Meeting

Meeting Title: GMEIWP ADB Mission Meetings- Stakeholder Consultation 1
Date:5th August 2019
Location: Ministry of Environment

Participants:

- Ministry of Environment (ME)
  - Mohamed Asif- Social and Environmental Safeguard Specialist.
  - Hana Farook- Assistant Project Coordinator

- Asian Development Bank (ADB)
  - Luca Di Mario- Urban Development Specialist/Project technical Leader
  - Ninnete Pajarillagu- Environment Specialist
  - Emma Marsnene- Senior Environmental Specialist
  - Miguel Diangan Jr- Environment Safeguards Consultant

- Asian Ifrastructure Investment Bank (AIIB)
  - Irish Fe Aguilar- Social Development Specialist

- Water Solutions
  - Ahmed Jameel- Senior Consultant
  - Mohamed Umar- Junior Environmental Consultant.

- Others
  - Chathuranga- Environment & Sustainability Manager, Crossroads
  - Pradeep Kumar- Chief Engineer, Adaaran
  - Mohamed Faruhad, Assistant Chief Engineer, Vellasaru
  - Sidath Anuruddha Paskuwal Handi, Chief Engineer, Vellasaru
  - Mohamed Sinan, Environmental Officer, Ministry of Tourism

Ministry of Environment

Male', Republic of Maldives.

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- Mariyam Nasheetha Nasheed- Director, Ministry of Gender, Family and Social Services
- Aminath Nizar- Prioject Director- Ministry of National Planning and Infrastructure.
- Ahmed Aiman Shareef- Project Coordinator, Greater Male' Industrial Zone
- Shamau Shareef- Deputy Mayor- Male' City Council
- Jerome Manuel- Area Chief Engineer- Centara Resort

Points presented:

- A series of stakeholder consultations would be held.
- An overview of the project through a video of the project was presented.
- It was noted that until the incinerator is operational, the waste collected would be bailed and kept.
- Participants were informed that emissions and impacts from the project would be within accepted levels
- Participants were informed numerous studies such as arithmetic surveys, marine surveys and dispersion modelling were conducted to ensure there were no impact on the environment.
- Participants were informed that the results from the marine survey indicated the sediment from the proposed site were more deteriorated than from the outside, but were within acceptable levels as per New Zealand standards
- It was noted that the ambient air quality was measured and that it showed that burning occurred during the weekdays.
- It was noted that a German model had been used for pollutant dispersion modelling and that it indicated that there was no impact from the 50m stake.
- Participants were informed that surveys were conducted for where the outfall for the cooling process would be and that it had indicated the coral colour was good in the southern part.
- It was informed that the water dispersion model was modelled at depths of 10m, 20m, 30m from the mean sea level for temperatures 5 degrees, 7.5 degrees and 10 degrees. It was noted temperatures greater than 10 degrees were not considered as per EPA's recommendation and that even at 10 degrees despite being indicated as red there was not much difference from the ambient depth.

Ministry of Environment
Male', Republic of Maldives.

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- A participant raised concern that a German model had been used and it was informed that this was a normal model.
- Participants inquired if the project had considered the increasing population, development projects and increased resorts expected in the zone. It was informed that the growth had been forecasted and taken into consideration during the feasibility studies.
- A participant inquired how the "oily waste" would be generated and it was informed that the primary focus of the project was addressing the solid waste issue in the country.
- A participant voiced that currently depending on the direction of wind many activities planned in the resort have to be cancelled due to the flies and smoke. It was inquired if smoke emissions from the WTE would be seen and how the issue of floating waste in the sea would be addressed, It was informed that there would be no smoke to be seen from the WTE plant and that all waste would be collected and transported by WAMCO in containerized vehicles in the sea thus there would be no spillage of waste.
- Participant inquired if during the transition period any measures would be taken to address the flies and it was informed that the waste collected would be covered.
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- A participant raised concerns that some resorts and individuals would still continue dump in the sea if they did not want to pay for the services of WAMCO.
- A participant inquired if there was any monitoring mechanism to assess the impact on the health of the people once the project is implemented. It was noted that this was something which could be considered.
- It was suggested to put an additional road in Thilfaushi to accommodate the increased traffic and future development projects. However, it was noted that the increased traffic would not be enough to justify a road.
- It was agreed to have a discussion with the City Council and Greater Male' Industrial Zone Pvt Ltd to discuss ongoing projects
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Ministry of Environment
Male', Republic of Maldives.

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Minutes of the Meeting

Meeting Title: GMEIWP ADB Mission Meetings- Stakeholder Consultation (Thilafushi)
Date:6th August 2019
Location: Ministry of Environment

Participants:

- Ministry of Environment (ME)
  - Mohamed Asif- Social and Environmental Safeguard Specialist.
  - Hana Farook- Assistant Project Coordinator

- Asian Development Bank (ADB)
  - Luca Di Mario- Urban Development Specialist/Project technical Leader
  - Ninnete Pajarillagu- Environment Specialist
  - Emma Marsnene- Senior Environmental Specialist
  - Miguel Diangan Jr- Environment Safeguards Consultant

- Asian Ifrastructure Investment Bank (AIIB)
  - Irish Fe Aguilar- Social Development Specialist

- Water Solutions
  - Ahmed Jameel- Senior Consultant
  - Mohamed Umar- Junior Environmental Consultant.

- Others
  - Hisham- Assitant Manager, Asrafee
  - Hassan Zareer- General Manager, Maldives Ports Limited
  - Ahmed Ibrahim- Manager, MPL
  - Ali Nashid, GM, Target
  - Mohamed Akman- Admin, Agas Maldives

- A participant raised concerns that there were many unutilised lots/sites in Thilafushi and that it had become a hub for many migrant workers. It was also noted that these placed had very poor living standards and that it needed to be looked into.
- A participant suggested to incorporate the cooling system inside the plant, as it could have an impact on the corals and reefs. It was noted that due to STELCO's cooling system in the sea, the corals and reefs were being affected. Member stressed the importance of ensuring the reef is not affected and suggested to keep the cooling system 30 meters deep and 30 meters away from the reef.
- A participant inquired how the waste would be segregated and sorted, and requested for more details. Participant stressed that lease waste, mercury, hazardous waste needs to be segregated and if not the bottom ash would contain harmful residuals.
- When inquired, participants mentioned that the current state of Thilafushi poses health risks to their employees such as irritation of eyes, ears and skin, and also difficulty in breathing and an overall decline in health which increased absenteeism, affecting the productivity.
- When inquired if anyone in Thilafushi fished in the area, it was highlighted that it was possible some migrant workers may do so.
- It was agreed to share the exact location of the business lots.

Minutes of the
Public Hearing for the EIA for the Regional Waste Management Facility at Zone 3 in Thilafushi

Venue: Auditorium, Ministry of Environment, Male', Maldives
Date: 4th September 2019
Time: 1400 hrs

1. Welcome

Mr. Ahmed Murthaza, Director General, Ministry of Environment thanked everyone for attending the public hearing held as part of the EIA carried out for the Regional Waste Management Facility to be established at Thilafushi for zone III in the Maldives. Mr. Murthaza noted that the meeting was organized by Ministry of Environment for a request by Water Solutions Pvt Ltd as the EIA consultant for the project. Public Hearing is part of the EIA work that is being carried out for the project in accordance with ADB Safeguard Policy and EIA Regulation implemented by EPA. Mr. Murthaza introduced the project team.

The main component of the Regional Waste Management Facility, includes, the waste to energy facility and the residual landfills at Thilafushi, which would be developed under a Design Build Operate (DBO) contract where the Design-Build period is expected to be 3 years. The Operation Service period is 15 years. The Design-Build of the facility will be funded by the Government of Maldives using the proceeds of a loan co-funded by the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), and the Islamic Development Bank (ISDB). The Operation Service component of the DBO contract will be funded by the Ministry of Environment and Energy (ME).

2. Purpose of the Meeting

Mr. Ahmed Murthaza explained that the purpose of the meeting was to inform public about the Thilafushi Regional Waste Management Project as well as the EIA process that is currently underway. The public meeting were to inform public and other stakeholders of the identified key issues, to provide public and stakeholders the opportunity to raise additional issues or concerns that have not been identified in the EIA.

3. Presentation

Mr. Mohamed Asif, Social and Environmental Safeguards Specialist - Greater Male' Environment Improvement and Waste Management Project, Ministry of Environment presented an overview of the project. He provided details of the Greater Male' Environment Improvement and Waste Management Project components including the waste to energy component which is the establishment of the waste to energy facility as part of the Regional Waste Management Facility at Thilafushi for Zone III. In his presentation he presented an overview of the ADB Safeguard Policy Statement (SPS) noted the components that is relevant to this project. He noted that EIA has been prepared in accordance with the requirements of ADB Safeguard Policy Statement, which categorized the Thilhafushi waste project as Category A, that required to undertake an EIA and the Terms of Reference (TOR) issued by the Environmental Protection Agency.

In his presentation, he presented the Grievance Redress Mechanism that had been developed for the project. He provided details of the mechanism outlining how the grievances could be addressed at First level, Second Level and Third Level where an individual or an interest group has the option of going to established judiciary system of the Maldives with their grievances.

Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided a detail presentation of the findings of the EIA that carried out for the Regional Waste Management Facility at Thilafushi for Zone III project. During the presentation, he provided details of the proposed Greater Male' Waste to Energy at Thilhafushi and provide a details of the context and rationale for the project. He explained the purpose of the EIA that had been carried out for the project and detail out the objectives of the EIA. The Terms of Reference issued for the project from EPA was presented and highlighted the key issues that was highlighted in the TOR. The EIA Consultant presented the approach the EIA team took undertake the EIA Study. The findings of the study was presented in very details including the existing environment of the study area focusing on the

physical environment providing the details of the topography of the site, marine water and sediment quality. Marine environment of study area was presented by covering the coral reef, marine water quality and sediment quality. The context of climate change and disaster risks were presented. The legislative and regulatory consideration which is important to the project was highlighted. The results of the air quality monitoring that was carried out for the baseline monitoring were presented.

After presenting the existing environment of the project site, significant environmental impacts were presented. These includes the environmental impacts during the construction stage and operation phase of the project. During the presentation, a very detail account of the hot water dispersion modelling work that was carried to study the impacts of hot water on the marine environment, air pollutant dispersion from the stack emission was presented.

One of the objectives of the EIA is to minimize or avoid environmental impacts from the project activities. The aspects that had been integrated into the design of the project was highlighted which are part of the impact mitigation measures identified in the EIA. Similarly the mitigation measures that was recommended to be undertaken during the construction and operation phase of the project were presented.

The alternatives to the project were also presented. Some of these were considered during the early stage of the project development.

As a last component of the presentation was the presentation of the Environmental Management Plan proposed for the project. This included the proposed environmental monitoring to monitor the impacts of the project during the construction and operation phase of the development. Additionally Health and Safety, Environmental Management Capacity and proposed Environmental Emergency Response Plan was presented.

4. Questions and Discussion.

It was asked if the residents of the area would benefit from this project.

***Mr. Asif stated that the residents** of Male', Villingili, Gulheefalhu and people working at Thilafushi would benefit directly from this project. The project would extinguish the smoke from Thilfushi dumpsite and waste to energy facility will help to manage, treat and dispose waste in a manner an acceptable way that will have no impact on the communities living around the facility. He explained that the project would also generate jobs for the entire region, not just the community.*

A participant asked why a large Incinerator has been proposed to manage the waste. He asked why sorting and reuse of waste has been not proposed as the method to manage the waste that is generated from Greater Male' Region.

Consultant answered to the question by saying that 3R strategy has been considered while developing the Regional Waste Management Project for the Greater Male' region and Zone III. Waste to Energy facility was considered as a measure to reduce the volume of waste that would go final landfilling as bottom ash and fly ash. Presently allocated land for land filling can be used for 15 years without bottom ash recycling. If bottom ash can be reused, then the life the landfill would be extended. Due to this reason the other methods for final treatment of waste has not been feasible in the Maldives.

A participant raised the question that incinerator would be fueling by high calorific materials such as plastics and this would become a disincentive to minimize the use of single use plastic.

Though waste to energy is main component of the regional waste management system at Thilhafushi, the sorting of the waste could be carried out at source, at transfer station and at

waste receiving area of Thilfushi. The waste management system developed for the Zone III does not discourage sorting, reduction of single use plastic and reuse of waste. These streams would improve in the future as a result of the public awareness and education programs that would be implemented as part of the project.

A participant raised the question that waste to energy plant will burn all type of waste. This will move the public away from sorting of the waste at source such as household and offices.

Consultant replied during the feasibility study stage of the project different methods and technologies for the management of waste was considered.

saying that a sorting facility cannot be accommodated in the Male' transfer station and there will be a civic amenity facility at Hulhumale' where people can bring in their sorted waste.

A participant raise the question that he wanted to know how much the tax payers will be paying to the DBO contractor to run the waste to energy plant at Thilafushi

Consultant replied that WAMCO or ME will establish a tariff system. Operator will charge a gate fee as well. Taxpayers will have to subsidize the management of waste. Mr. Murthaza clarified that the Ministry and the project team is in discussion to work out a tariff system that would not be a burden the public but it would generate enough revenue to keep the operations in a sustainable mode.

A participant raise the question that why Ministry of Energy is undertaking an energy project not a waste management project to address the current urgent waste issue at Thilafushi.

Mr. Murthaza answered to this question. He stated that the Ministry of Environment has no intention of implementing an energy project. The proposed project is a waste management project. Waste to Energy specialist working for this project have noted that the waste incinerator with or without the waste to energy system would have no impact on the efficiency of the incinerator. However with a waste to energy system, the plant can generate 8MW of electricity which can be used for Thilafushi and for the Greater Male' Region with the government vision of having a bridge which connects Male' to Thilafushi.

A participant raise the question that hazardous and medical waste cannot be treated at a waste to energy plant. So how this kind of waste generated in Male' can be managed or treated.

It was noted from the consultant that waste to energy plant can manage small quantity of the waste. However batteries should not be incinerated. Mr. Murthaza replied that the hazardous waste would be separated, stored in appropriate containers.

A participants raised the issue of ownership of the energy that would be produced from the Waste to Energy facility and other valuable by products.

Mr. Murthaza. replied that the ownership and responsibility of the products from Waste to Energy facility has not been decided. This includes energy from waste to energy, metals and bottom ash. Excess energy will be converted into hot water and discharge to the sea. One of the options that is being discussed to have a business model would be made to determine a percentage of profit from sale of such projects to the operator.

A participant enquired when the open burning will stop at Thliafushi.

Mr. Asif replied stating that one of the most priority of the project is to stop the burning and extinguish the smoke from Thilafushi. The project is trying to procure urgently needed equipment to better manage the existing dumpsite at Thilfushi. With this intervention, WAMCO will be able to cover the waste that is dumped to the waste mount on a daily basis which will

prevent the fire and smoke. The project is also recruiting an expert on managing the dumpsite who will train and oversee the operation of WAMCO at Thilafushi dumpsite.

A participant enquired about the capacity of the incinerator that had been designed for and if the design foresees a decrease in waste generation.

The consultant explained that during the feasibility stage a number of scenarios was considered. The proposed design has a number of mechanism to mitigate the risk either waste received is higher than the forecasted amount or lower than the forecasted value. Waste generation of 500 tonnes per day without CnD waste is expected for 2022. Waste is also expected to increase from the tourism industry and after the airport development project is completed. There needs to be policy level changes to incorporate and implement sorting and waste reduction, such has less packaging. These would help to lower the growth of amount of waste generation. This can delay the construction of the third line in the waste to energy facility.

A member of the community enquired whether they could see the final draft of the EIA and the studies that had been completed as part of the project. He also enquired whether he could submit comments to EIA when it released to the public.

The consultant explained that the draft final report will be made public at ADB and EPA website. ADB will make it public for commenting for 3 months as part of the ADB ADB Safeguard Policy Statement for Category A project. Hence the public is encouraged to submit comments and concern to the project. Mr. Asif also explained that through the Grievance Redress Mechanism for the project, the public can address their Grievances to the project during the project implementation stage. Any comments or concern raised would be considered by the project team.

5. Closure

The meeting ended at 1530.

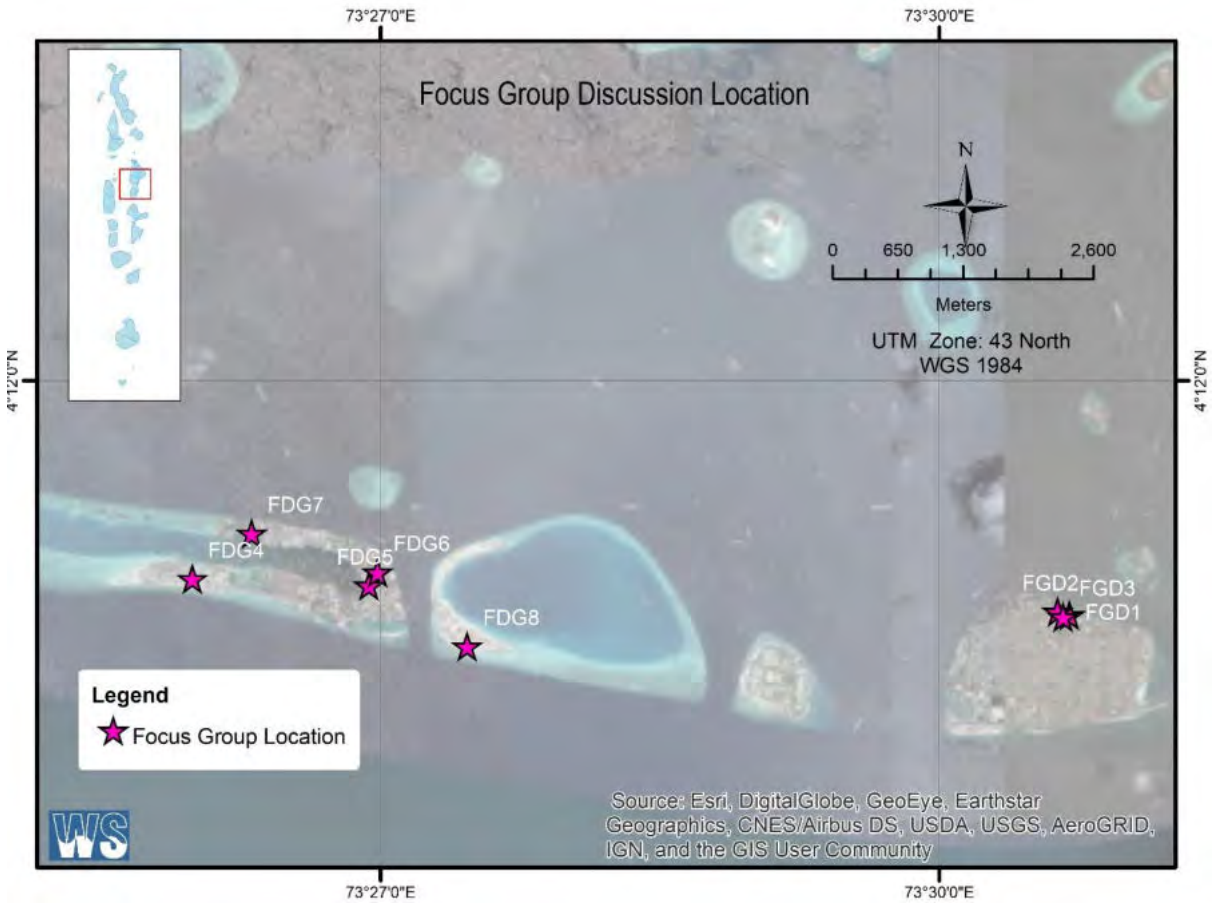
Photos from the Public Hearing Meeting


PUBLIC CONSULTATION
ADB

Minutes of the Focus Group Discussions
EIA for the Regional Waste Management Facility at Zone 3 in Thilafushi

Table of Contents

1 Locations where Focus Group Discussion were held



3 Focus Group Discussions 1

Venue: Jumhoori Park, Male', Maldives
Date: 30th August 2019
Time: 1630 hrs

A focus group discussion was carried out with the expatriates living in Male'. The expatriate communities comes to the Jumhoori Park Public Square on Friday afternoon. The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist - Greater Male' Environment Improvement and Waste Management Project, Ministry of Environment. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

The FDG were women and all of them in the group have not been to Thilafushi. They are mostly domestic workers working at houses in Male'. However they have seen the smoke rising from Thilafushi from western side of Male'. Some of them said they have experience the bad smell coming from Thilafushi on some days.

Some of the members in the group said they have friends who have visited Thilafushi and they said the island has a very big waste dumpsite. Some days the waste site is on fire.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working at the island.

Closure

The meeting ended at 1700 hrs

Attendance - Focus Group Discussions 1

Following people were at FDG. Most of the people in the group were reluctant to give details of their contact.

Name	Gender	Country	Contact
Latha	Female	Work as a housemaid. Expatriate from India	-
Nirumalee	Female	Work as a housemaid. Expatriate from India	-
Dharushinee	Female	Work as a housemaid. Expatriate from India	-
Charanjee	Female	Work as a housemaid. Expatriate from India	-
Phrajeet	Female	Work as a housemaid. Expatriate from India	-
Anjali	Female	Work as a housemaid. Expatriate from India	-
Gittu	Female	Work as a housemaid. Expatriate from India	-
Paramjit	Female	Work as a housemaid. Expatriate from India	-
Baljeet	Female	Work as a housemaid. Expatriate from India	-
Mamta	Female	Work as a housemaid. Expatriate from India	-
Thn	Female	Work as a housemaid. Expatriate from India	-
Sarita	Female	Work as a housemaid. Expatriate from India	-

Photos from the Focus Group Discussions 1

4 Focus Group Discussions 2

Venue: Jumhoori Park, Male', Maldives
Date: 30th August 2019
Time: 1710 hrs

A focus group discussion was carried out with the expatriates living in Male' at Jumhoori Park Public Square on Friday afternoon. The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist - Greater Male' Environment Improvement and Waste Management Project, Ministry of Environment. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

Everyone in the group knows about Thilafushi as they know it is place they can find work easily. Some of them have been Thilhafushi and knows about the smoke and its impact on the people on the island. Most of the people in the group were employed as construction workers working at construction sites in Male'.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working at the island.

Closure

The meeting ended at 1730 hrs

Attendance - Focus Group Discussions 2

Following people were at FDG. Most of the people in the group were reluctant to give details of their contact.

Name	Gender	Country	Contact
Akash	Male	Expatriate from Bangledhesh working as a construction laborer	-
Shahidul	Male	Expatriate from Bangledhesh working as a housemaid	-
Prito	Male	Expatriate from Bangledhesh working as a construction laborer	-
Manzoor	Male	Expatriate from Bangledhesh working as a house helper	-
Anawar	Male	Expatriate from Bangledhesh working as a construction laborer	-
Hossain	Male	Expatriate from Bangledhesh working as a house worker	-
Sarker	Male	Expatriate from Bangledhesh working as a construction laborer	-
Munes	Male	Expatriate from Bangledhesh working as a house helper	-
Wasif	Male	Expatriate from Bangledhesh working as a construction laborer	-
Reza	Male	Expatriate from Bangledhesh working as a construction laborer	-
Athiu	Male	Expatriate from Bangledhesh working as a paint worker	-
Sharee	Male	Expatriate from Bangledhesh working as a house helper	-

Photos from the Focus Group Discussions 2

5 Focus Group Discussions 3

Venue: Jumhoori Park, Male', Maldives
Date: 30th August 2019
Time: 1740 hrs

A focus group discussion was carried out with the Maldivians living in Male' at Jumhoori Park Public Square on Friday afternoon. The group mainly had Maldivian women who were at the park. The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist - Greater Male' Environment Improvement and Waste Management Project, Ministry of Environment. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

Everyone in the group knows about Thilafushi. Some of the women were from islands who were visiting Male'. Everyone in the group knew Thilafushi is the island where waste is taken from Male'. They said the waste taken at Thilafushi is burnt as they have seen smoke rising from big mountain at Thilafushi. Some people in the group said some days, they can smell really bad from the smoke coming from Thilhafushi. The people in the group said the smoke at Thilhafushi need to be stopped. A group member asked when the fire will be stop at Thilafushi. She was told that one of the main priority of the project is to stop smoke risking and this is an urgent work that will be carried out. The group was informed that the implementation of the Greater Male' Waste to Energy Project will not have visible smoke emitting from the long stack that would be constructed at Thilhafushi.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working at the island.

As we were concluding the FGD, Vice President of Maldives came to the park with his son. He met the members of the FGD.

Closure

The meeting ended at 1800 hrs.

Attendance - Focus Group Discussions 3

Following people were at FDG. Most of the people in the group were reluctant to give details of their contact.

Name	Gender	Country	Contact
Nadheema	Female	Maldivian	-
Amira	Female	Maldivian	-
Shareef	Female	Maldivian	-
Fathimath	Female	Maldivian	-
Aishath	Female	Maldivian	-
Nihaani	Female	Maldivian	-

Photos from the Focus Group Discussions 3

6 Focus Group Discussions 4

Venue: Thilhafushi, Maldives
Date: 1st September 2019
Time: 1000 hrs

A focus group discussion was carried out with the people working at Thilhafushi, west of the proposed waste to energy project site. The group mainly had expatriate workers and Maldivian supervisor who were doing some construction work at Thilhafushi. The group members said that they have been working at Thilafushi over a year. All of the group members comes to work at Thilhafushi in the morning and leave to Male' in the afternoon. They take the public ferry to Thilhafushi.

The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

Everyone in the group knows about smoke issuing facing Thilafushi as they have to cross the site on a daily basis. The group member said, the situation of smoke depends on the wind direction. If they have to work downwind, the situation becomes very difficult. Some days, they have to stop work because the smoke makes it impossible for them to work. The group members said, urgently the smoke issue need to be addressed and better waste management need to implement at Thilhafushi. The group member said they have seen a number of development near the waste dumpsite. They pointed out new land had been reclaimed and new equipment had been installed to manage the waste.

A group member asked when the fire will be stop at Thilafushi. He was told that one of the main priority of the project is to stop smoke risking and this is an urgent work that will be carried out.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working at the island. They said they hope that the big stack at the new waste to energy plant will not have any visible smoke emitting from the long stack that would be constructed at Thilhafushi.

Closure

The meeting ended at 1030 hrs.

Attendance - Focus Group Discussions 4

Following people were at FDG.

Name	Gender	Country	Contact
Abdul Mannan	Male	Maldivian	7967447
Al Ameen	Male	Expatriate from Bangledhesh working as a construction laborer	-
Santil	Male	Expatriate from Bangledhesh working as a construction laborer	-
Mumeen	Male	Expatriate from India working as a construction laborer	-
Algiri	Male	Expatriate from Bangledhesh working as a construction laborer	-
Balaau	Male	Expatriate from India working as a construction laborer	-
Amir	Male	Expatriate from Bangledhesh working as a construction laborer	-
Shahid	Male	Expatriate from Bangledhesh working as a construction laborer	-
Haleem	Male	Expatriate from Bangledhesh working as a construction laborer	-

Photos from the Focus Group Discussions 4

7 Focus Group Discussions 5

Venue: Thilhafushi, Maldives
Date: 1st September 2019
Time: 1100 hrs

A focus group discussion was carried out with the people working at Heavy Force Site 2 at Thilhafushi. The site is located north east of the proposed waste to energy project site. A total of 8 people participated in the discussion: 6 were Bangladeshi and two were Maldivian. All of the Bangladeshi participants are employed under "laborer" visas. However, their work ranged from cleaning the barge to driving vehicles. The two Maldivians worked in supervisory positions. All of the group members has been living at Thilafushi for more than one year.

All of the participants said they would be willing to continue to work in their current jobs even though the site is impact from the heavy smoke from the waste dump site. At night Thilhafushi is a very quiet place. A participant told that at night, they would some time hear explosion from the dumpsite as bottles and canister catches fire.

The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

The group member said, the situation of smoke depends on the wind direction. If they have to work downwind, the situation becomes very difficult. Some days, they have to stop work because the smoke makes it impossible for them to work. During the discussion, issues related when the smoke would be extinguish, when the project start and what will to the surrounding area after the completion of the project were covered.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working at the island.

Closure

The meeting ended at 1100 hrs.

Attendance - Focus Group Discussions 5

Following people were at FDG.

Name	Gender	Country	Contact
Shahid Haleem	M	Maldivian, Supervisor, Heavy Force	7902107
Hussain Fayaz	M	Maldivian, Excavator Driver, Heavy Force	7920107
Haithim	M	Bangladesh, Labourer, Heavy Force	
Sumon MD	M	Bangladesh, Labourer, Heavy Force	
Shibu bai	M	Bangladesh, Labourer, Heavy Force	
MD Suhail	M	Bangladesh, Labourer, Heavy Force	
MD Turaab	M	Bangladesh, Labourer, Heavy Force	
MD Suraab	M	Bangladesh, Labourer, Heavy Force	

Photos from the Focus Group Discussions 5

8 Focus Group Discussions 6

Venue: Waste Management Site at Thilhafushi, Maldives
Date: 1st September 2019
Time: 1230 hrs

A focus group discussion was carried out with the people working at Thilhafushi waste management site. The focus group discussion was held at WAMCO Office during their lunch time break hours. A total of 13 people participated in the discussion: 11 were Bangladeshi and two were Maldivian. All of the Bangladeshi participants are employed under work permit working at Thilafushi. Their work ranged from cook to excavator drivers. The two Maldivians worked in supervisory positions. Most of the group members has been living at Thilafushi for more than one year. The supervisors comes to Thilhafushi to work and return back to Male' in the afternoon. They take the public ferry to Thilhafushi.

The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

Everyone in the group are familiar with smoke issuing facing Thilafushi as they work at the waste management site on a daily basis. Most of the members of the group have bad experiences working in the smoking conditions. Some said, they get red eyes when they work and others said they get throat infection. Some say, they have to take sick leave on regular basis.

The members of the group said, the smoke from the dumpsite could be extinguish when they get additional heavy machineries to handle the waste and manage the dumpsite. The group felt that improving the waste management at Thilhafushi will improve the condition of people working at the island. All of the participants said they would be happy to continue to work at Thilhafushi when the dumpsite if properly managed. Some of the participants said they did not have any concerns of losing their job in the future, when the project is completed.

Closure

The meeting ended at 1300 hrs.

Attendance - Focus Group Discussions 6

Following people were at FDG.

Name	Gender	Country	Contact
Hazim Ibrahim	M	Maldivian, Assistant Manager, WAMCO	799146
Mohamed Asraf	M	Maldivian, Supervision, WAMCO	9908430
Mohamed Yoosuf	M	Bangladesh, Driver, WAMCO	
Sadir	M	Bangladesh, Driver, WAMCO	
Asadhul	M	Bangladesh, Driver, WAMCO	
Narayan	M	Bangladesh, Lorry Driver, WAMCO	
Oulal	M	Bangladesh, Labor, WAMCO	
Halim	M	Bangladesh, Cook, WAMCO	
Habib	M	Bangladesh, Lorry Driver, WAMCO	
Sohel	M	Bangladesh, Lorry Driver, WAMCO	
Sadik	M	Bangladesh Lorry Driver, WAMCO	
Muneer	M	Bangladesh, Lorry Driver, WAMCO	
Faisal	M	Bangladesh, Lorry Driver, WAMCO	

Photos from the Focus Group Discussions 6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9 Focus Group Discussions 7

Venue: Thilhafushi, Maldives
Date: 2st September 2019
Time: 0930 hrs

A focus group discussion was carried out with the people working at the MTCC Boat Yard at Thilhafushi, All participants were male and their age ranged from 30 years to 50 years. The site is located directly north of the waste dumpsite at Thilafushi. The group mainly had Maldivian working at the site. Most of the members of the group had been working at Thilafushi for a long time. Some of the members in the group works and live at the site at Thilafushi. There was a high rate of job satisfaction amongst the workers. Their key reasons include high salaries, regular pay and good benefits such as food and accommodation. The group members said around 100 people work at Thilafushi site. The work at the site requires them to work outdoors all the time. Hence it makes very difficult during south west monsoon as most of the days the site is covered by the smoke. The

Most of them, especially the supervisors believed that the equipment in the Waste Management Section need to be upgraded immediately. The constant smoke from open burning, particularly during southwest monsoon when their site is directly in the path of the smoke plume, causes discomfort. Some workers said that they have got used to it and thus they no longer are able to understand its effects.

The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project.

Everyone in the group knows about smoke issuing facing Thilafushi as they see it every day which is across the bay on other side of their site. The group member said, the situation of smoke depends on the wind direction. If they have to work downwind, the situation becomes very difficult. Some days, they have to stop work because the smoke makes it impossible for them to work. Even when they come indoors, the smoke will fill the rooms and the smoke will come through the air conditioning unit. The group members said, urgently the smoke issue need to be addressed and better waste management need to implement at Thilhafushi. The group were brief that one of the activity of the project is to stop the smoke coming from the exiting dump and it will happen early next year. The group members said that because of the smoke and current situation at Thilafushi, they are unable to attract good talents and experience professionals to work at the boat building yard at Thilhafushi.

A group member said he have seen a number of cases where the workers get stick and he believes it is due to the smoke. Improve the situation at Thilafushi waste site with the proposed project will have a very positive impact on industries at Thilafushi. They would be able to improve their services by attracting good and experience professional to work at their site.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working and living at the island. Everyone welcomes the project said they are hoping the implementation of the project would commence soon. They said they hope that the big stack at the new waste to energy plant will not have any visible smoke when it becomes operational.

Closure

The meeting ended at 1030 hrs.

Attendance - Focus Group Discussions 7

Following people were at FGD

Name	Gender	Country	Contact
Moahmed Husham	M	Maldivian, General Manager, MTCC	7773653
Abdulla Abdu Shakoor	M	Maldivian, Manager, MTCC	791220
Mohamed Rasheed	M	Maldivian, Engineer, MTCC	7785716
Mohmed Fahty	M	Maldivian, Engineer, MTCC	7747379
Iqbal	M	Maldivian, Engineer r, MTCC	7708026
Sameeu	M	Maldivian, Engineer, MTCC	7914961
Ghina	M	Maldivian, Engineer, MTCC	
Inrhaim Mohamed	M	Maldivian, Accounts Officer, MTCC	7795575
Abdul Shafeeu	M	Maldivian, Welder Supervisor, MTCC	7795575
Abdul Hussam	M	Maldivian, Senior Engineer MTCC	78397615

Photos from the Focus Group Discussions 7

10 Focus Group Discussions 8

Venue: Gulheefalhu, Maldives
Date: 2st September 2019
Time: 1130 hrs

A focus group discussion was carried out with the people working and living at Gulheefalhu. Gulheefalhu is an island which is located east of Thilafushi. The group mainly Maldivian working at Greater Male' Industrial Zone Limited. The group members said that they have been working at Gulheefalhu over many years. There was one member of the group who had work at Thilfushi waste management site before he joined Greater Male' Industrial Zone Limited. He said working at Gulheefalhu is very comfortable than working at Thilhafushi due to the smoke and difficulties related to the smoke. The group members said, Gulheefalhu is impact during south west monsoon on some days when the wind takes smoke over the island from Thilafushi waste dump site. Some of the group members comes to work at Gulheefalhu in the morning and leave to Male' in the afternoon. They take the public ferry to Male' from Gulheefalhu. Others live in Gulheefalhu.

The participants of the FGD were presented the Greater Male' Environment Improvement and Waste Management Project by Mr. Mohamed Asif, Social and Environmental Safeguards Specialist. Mr. Ahmed Jameel, EIA Consultant at Water Solutions provided the findings of the EIA to the group members. Colour Maps printed on A3 was used as aid to show the present situation of Thilafushi, the proposed Greater Male' Waste to Energy Project and bird eye view of Thilafushi after the completion of the project. The group were briefed that when the Greater Male' Waste to Energy project is implemented and the facility is operational in 2022/2023 there will be no emission from the stack of the incinerator.

Everyone in the group knows about smoke issuing facing Thilafushi. The group members said, urgently the smoke issue need to be addressed and better waste management need to implement at Thilhafushi. The group member said they have seen a number of development near the waste dumpsite but the small incinerators that were installed at the site was a waste of money as it is not been used. The group was informed that those incinerators would be moved to other islands as these were installed temporarily.

A member of the group asked whether it is safe to fish from the Gulheefalhu house reef. The EIA consultant explained no government agency, including Health Protection Agency, Environmental Protection Agency or Marine Research Center has issued any notice restriction of fishing at the Gulheefalhu or Thilhafushi House reef. It has been general practice that no fishing would be carried out from the reef nest to the waste dumpsite. Hence it would not advisable to fish from such reefs. The test carried out by the EIA team has not seen an increase of heavy metals in sediments and marine water that was sampled for the study.

The group felt that improving the waste management at Thilhafushi will improve the condition of people working at Gulheefalhu. Gulheefalhu is a nice place to work, but the work condition gets deteriorated on some days because of the smoke from Thilafushi.

Closure

The meeting ended at 1200 hrs.

Attendance - Focus Group Discussions 8

Following people were at FGD.

Name	Gender	Country / Office	Contact
Ahmed Faisal	M	Maldivian, Greater Male' Industrial Zone	9930909
Mohamed Ziyaad	M	Maldivian, Greater Male' Industrial Zone	7912228
Mohamed Adil	M	Maldivian, Greater Male' Industrial Zone	7741234
Sheer Ahmed	M	Maldivian, Greater Male' Industrial Zone	9558184
Ahmed Ihrish	M	Maldivian, Greater Male' Industrial Zone	9724819
Ibrahim Razee	M	Maldivian, Greater Male' Industrial Zone	7743049
Hassan Saeed	M	Maldivian, Greater Male' Industrial Zone	7753347

Photos from the Focus Group Discussions 8

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Ministry of Environment
Male', Republic of Maldives.

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ދާދި، ދިވެހިރާއްޖެ.

Minutes of the Meeting

Meeting Title: Public Consultation for Environmental Impact Assessment (EIA) of Regional Waste Management Facility
Date: 28th October 2019
Location: MNU Auditorium

Participants:

- Ministry of Environment (ME) -
  - Ibrahim Zameel — Project Manager
  - Mohamed Asif — Social and Environmental Safeguard Specialist
  - Sham'aan Shakir — Information Education and Communication Specialist
  - Hana Farook — Assistant Project Coordinator

- Waster Solution- EIA Consultant
  - Ahmed Jameel — EIA Consultant

- *Other* Participants
  - Fathimath Rishana
  - Abdullah Adam
  - Ahmed Mohamed
  - Adam Isham
  - Humaida Abdul Gafoor
  - Ahmed Afrah Ismail
  - Mariyam Mohamed
  - Juma Ahmed
  - Aleef Naseem
  - Hoodh Ahmed
  - Mohamed Rasheed (Bari)
  - Abdul Aleem

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Ministry of Environment މިނިސްޓްރީ އޮފް އެންވަޔަރަންމަންޓް

Male', Republic of Maldives. މާލެ، ދިވެހިރާއްޖެ.

Points presented:

- Overview of the Project
- Results of the Environmental Impact Assessment of the Regional Waste Management Facility

Issues raised *and response:*

Timing and venue of the public consultation

- Some of the participants raised concern that the timing of the public consultation was not ideal as it falls within the official working hours. A participant also suggested that the University Auditorium was not ideal and that the closed space would discourage people from attending the public consultation. It was suggested that future public consultations should be held after the official working hours in the evening and at a public space such as the "Jumhooree park" to encourage more people to attend.
  - *ME informed that the points mentioned would be taken into consideration for future public consultations*

High-level Technology fund

- A participant inquired what was meant by the high-level technology fund
  - *ME informed they would clarify and inform later. Towards the end of the discussion it was informed that a High-Level Technology Fund is a multi-donor trust fund that provides grant financing to encourage more widespread adoption of high-level technology (HLT) to address development challenges in ADB's developing member countries*

Capacity building

- A participant inquired since there is capacity building in phase 1, what was already being done to acquire information
  - *ME informed that a firm would be hired for capacity building activity and that that the firm would be working throughout the project to build the capacity of the community.*

Involvement of Women.

- A participant inquired why involvement of women was specified in awareness raising.
  - *ME noted that the project aims to increase the involvement of women throughout the different activities planned in the project and as such even the committee under the Grievance Redress Mechanism also specifies that the president of the island's women's committee be included. Women had been involved in all stages of the project development.*

Reduction of Waste

- A participant inquired the plans to reduce waste. Another participant added that instead of incinerating, the solution would be to reduce wast, and decrease the import of items that would create waste.
  - *ME informed that under the project there were plans to increase community awareness with regard to waste reduction. The EIA consultant added that there would be a focus on 3R under the community awareness and behaviour change strategies.*

- A participant raised concern that incineration was being used as the solution to reduce waste and stressed that incineration and re-using the 'gunk' from the incineration plant was not the solution.

  - *In the management of waste, even after carrying out successful waste reduction strategies, there will be residual waste that need to be treated and disposed. Incineration has been recommended as an optimum technology for the Maldives. ME informed that the bottom ash could be utilised for road development and that currently a feasibility study was being undertaken.*

- A participant inquired if the government's pledge to reduce waste to 3 percent would have an impact on the operation of the plant.
  - *The proposed waste management strategy had taken account to waste reduction strategies. The proposed system would have no impact with current change of policy to ban the use of single use plastic by 2024.*

Public involvement for the whole project

- A participant raised concern that the public consultation was only for the regional waste management facility and not for the whole project.
- Moreover, it was added that public involvement should have been at an earlier stage, before incineration was chosen as the way forward to manage waste, as it is similar to the World Bank waste management project in Vandhoo which had failed.
  - *ME noted that the waste management project for Zone III has been formulated based on the lesson learnt from the Vandhoo Project. Vandhoo project was s a Design and Build project, and the project had failed because the operator of the facility was different and the Government took a while to handover the facility to WAMCO to run the facility. The current project for the Zone III is a DBO, Design, Built and Operate, building on the lessons from Vandhoo case..*
- A participant added that they were not aware of the level of consultations which had taken place with regard to the project. And that since all government infrastructure development projects (such as the Gulhifalhu Reclamation, development of resorts on shallow, development of harbours in the islands) are related, it needs to be considered, and Mministries and other big companies needs to consulted before undertaking such a project.
  - *ME informed that stakeholder consultations had taken place at all the stages of project formulation from feasibility to EIA. During the feasibility stage, stakeholders were consulted and stakeholder meetings were held. During the designing stage of the project, stakeholders were consulted. Various stakeholders and communities meeting were held for the EIA for this project in the past 24 months. During these meetings, relevant ministries, resorts and companies had also been invited to participate in the stakeholder meetings and workshops.*
- Many participants suggested that a multi sectoral discussion should be held for the consultation to be more meaningful. It was also noted that the outcome of the stakeholder meetings was not known to the public.
- A participant inquired how much the comments received from the public would be incorporated. Another participant also inquired if the minutes of the meeting would be available.
  - *ME informed that the project formulation has been guided by the inputs from stakeholders in different stages of the project. The minutes of the consultations will be included in the EIA*

Sustainability of the project

- A participant inquired how the project aligns to the SDG goals 1,2,3. He also added that the project had no engagement of the community. He also stressed that civil society should be part of the project instead of creating mega-companies. He also questioned if such a project would be financially sustainable and the dollar value of the cost to the community. He also inquired how the project would affect the human capital and enhance human development. He also drew

examples of the Male' Sewerage Project which in his opinion had failed and did not work as designed, because there was no proper oversight from the regulator of the company.. He also highlighted that a gap between the design, installation and operation of a project could affect the sustainability of the project, thus a systematic approach would be needed. Another participant also questioned if the approach was sustainable.

  - *ME noted that the various stakeholders including NGOs and Civil Society groups has been engaged in the project development. The project aims to build the overall institutional capacity in the country. And as such, improving the institutional capacity of EPA is a priority. Moreover, since it's a DBO (Design Build Operate) project, the operational issues would be minimized and local capacity would be developed before the operation is handed over to the Ministry/WAMCO at the end of the DBO period.*

- A participant inquired if ME could assure that project would be sustainable and the sustainability plans of the project. Similarly, another participant also questioned the sustainability of the project and inquired if all these aspects had been considered.
  - *ME informed that lessons from similar projects were being considered, and feasibility studies were undertaken to ensure the project was viable.*

No solution for bottom ash

- A participant raised concern that there was no solution for the bottom ash produced from the WTE facility. And stressed that before the project starts there should a proper way for it to be utilised as currently its only a study which is being undertaken.
  - *EIA consultant briefed that currently there is work going to study the alternative uses for the bottom ash. Presently the study is being focused to use the bottom ask on the production of paving blocks and other similar kind of use in the construction industry. It was also noted that a key objective of the project is to address the waste issue in Thilafushi.*

Producer responsibility and consideration of other government projects

- A participant inquired about the details of the grant and loans and suggested that producers should take responsibility of the waste they generate, and if not, it would be a misusing state funds. As such, she highlighted that resorts are one of the biggest generators of waste and that currently waste from all resorts are being taken to Thilafushi. Thus, the participant questioned how thoroughly the project had considered all these issues, and stated that the project seems like a reactionary project and a band-aid solution. She also inquired if the increasing number of resorts and other infrastructure projects had been considered. Another participant also inquired if the population growth in the Greater Male' region had been considered.
  - *EIA consultant briefed the waste to energy facility for the zone III is being financed by ADB through a grant/concessional loan. Resorts bring the waste to Thilafushi because current regulations requires the waste from the resorts to be brought to Thilafushi for disposal. The feasibility considered that waste generated from the resorts in the zone III would be brought to Thilafuishi for treatment and disposal. WAMCO will be collecting the waste from the resort and the resorts will pay collection fee to WAMCO which includes the cost of treatment/disposal. The feasibility study considered the populations in the zone III, including the planned increase of resort beds in the region.*

EIA

- A participant also informed that they had been requesting for the EIA and was yet to receive it. Another participant also questioned the results of the EIA, as the participant stated that Thilafushi was dead in terms of bio-diversity thus the results were questionable.
  - *ME informed that the EIA would be shared once the EIA is finalised. It was mentioned that the EIA and annexes including the studies that is part of the EIA would be made available at the ADB website soon for comments. It would be made available on the*

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website for a period of 3 months. EPA would also publish it on their website, once the ME submits the final EIA to EPA.

Inefficiency and ineffectiveness of ME and EPA

- Participants raised concern over the ineffectiveness of Ministry of Environment and the Environmental Protection Agency. It was noted that they do not hear back from the organisations in a timely manner for other matters that they have contacted to those institutions. It was also noted that EPA should have the capacity monitor air emission levels from the project.
    - *PM noted that the project would response on any queries regarding this waste project. ME noted that part of the project is to build the capacity of EPA and strengthen institutional capacity to monitor the air pollution emissions. Air pollution emission stations are recommended to be established at Thilafushi to monitor the impacts of stack emission on Thilhafushi.*

Other waste

- A participant inquired how hazardous waste, medical waste, construction and demolition waste, and end of life vessels would be handled at Thilafushi when this project is completed.
    - *ME noted that all the hospitals and health care facilities are required to have autoclaves to treat the medical waste before it is send to Thilhafushi for treatment and disposal. The proposed facility can manage the hazardous waste in the household. The facility would store any other hazardous waste received. The facility can receive end of life vehicles. ME noted that the facility at Thilhafushi is a municipal solid waste incinerator facility. Government is developing another facility to treat hazardous waste.*

Terms of Reference

Greater Male Waste-to-Energy Project

Project Management, Design and Construction Supervision (PMDCS) Consultant

A Background

1. The Greater Malé capital region and its outer islands (classified as Zone 3 in the national solid waste management policy) suffer from severe environmental pollution and deteriorating livability because of inadequate collection and haphazard disposal of solid waste. Zone 3 covers 35 inhabited islands, 73 tourist resorts, 14 city hotels, and 177 guest houses, in the North Ari Atoll (Alifu Alifu Atoll), South Atoll (Alifu Dhaalu Atoll), Malé' Atoll (Kaafu Atoll) and Vaavu Atoll, including the capital city of Malé, with a total population of 216,000 (51% of Maldives). Lack of a sustainable system to manage the 774 tons per day (tpd) of solid waste generated in Zone 3 (results in waste spillage into the ocean, and open dumping and burning of garbage at the 30-year old 10-hectare dumpsite on Thilafushi Island which has no pollution control measures creating a public health and an environmental hazard.[1] Plumes of smoke visible from the capital Malé, the international airport and nearby resorts compromise air quality and pose nuisance to residents and tourists, while leachate and plastics contaminate the surrounding marine environment.

2. The Government of Maldives is committed to improve the environmental conditions and to strengthen the solid waste management (SWM) system in the country. For Zone 3, the government plans to develop a sustainable regional waste management facility on a newly reclaimed 15 ha land on Thilafushi island adjacent to the current dumpsite. The facility will include a 500 tons per day waste to energy treatment plant (WTE) including a bottom ash processing plant, a landfill for air pollution control (APC) residues and bottom ash including leachate treatment plant. The facility will be developed through a Design-Build-Operate (DBO) Contract (the "Contract") pursuant to the FIDIC Gold Book, with design and build period proposed to be financed by the Asian Development Bank (ADB), Asian Infrastructure Investment Bank, ADB's Japan Fund for Joint Crediting Mechanism, and the government under the Greater Male Waste to Energy Project (the project). The government will cover the cost for the 20 years operation period. The project will mitigate greenhouse emissions and will be registered as joint crediting mechanism.

3. A shortlist of pre-qualified firms was finalized in fourth quarter 2019 and invitations for bids for the DBO contract is expected by December 2019. The DBO Contractor (the "Contractor") will be awarded in the fourth quarter of 2020, with the facility to be commissioned within 3.5 years after the notice to proceed. Included in the scope of the Contractor is design, build and operation of the facility, and also preparation of the permitting application for the construction and operation of the WtE plant. The volume of the design-build (DB) component of the DBO Contract is expected to be around $120 million.

4. The WTE facility will receive waste that is collected in Zone 3 and transferred to Thilafushi Island. Collection and transfer of solid waste is not part of the Contractor's scope. Besides this waste, a stockpile of baled waste that is generated in the transition phase after closing the dumpsite and the commissioning of the WTE will also be incinerated.

[1] The population is expected to grow to 300,000 within the next five years. In 2022 the expected generation of municipal solid waste (MSW) of residents, commercial and industrial entities and institutional bodies is approximately 115,000 tonnes which is complemented by another 70,000 to 100,000 tonnes of construction and demolition waste. Breakdown of solid waste by type: construction and demolition = 530 tpd (68%), household = 149 tpd (19%), resort = 48 tpd (6%), commercial = 27 tpd (3%), airport = 9.3 tpd (1.2%), industrial = 6 tpd (0.8%), market = 2.5 tpd (0.3%), hazardous = 1.5 (0.2%), and end-of-life vehicles = 0.65 tpd (0.1%). Source: Government of Maldives, Ministry of Environment and Energy. 2018. Feasibility Study for an Integrated Solid Waste Management System for Zone III (including Greater Malé) and Preparation of Engineering Design of the Regional Waste Management Facility at Thilafushi. Malé

5. The Ministry of Finance (MOF) is the executing agency while Ministry of the Environment (MOE) is the implementing agency. MOE will own and be in charge of the WTE facility operations. The state-owned Waste Management Company Ltd. (WAMCO) or other contractors will be the supplier of waste to the WTE facility. The Environmental Protection Agency (EPA) is responsible for regulatory activities for waste management and pollution prevention. The State Electricity Company Ltd. (STELCO), Greater Malé Industrial Zone Limited (GMIZL), Ministry of Planning and Infrastructure and Malé City Council are relevant stakeholders.

6. With respect to the FIDIC terminology, MOE will be the Employer.

Further information

7. The Greater Male Waste to Energy Project will complement the ongoing Greater Male Environmental Improvement and Waste Management Project (GWEIWMP), assisted by ADB $33 million grant. GWEIWMP supports (i) solutions for immediate control of nuisances from Thilafushi Island dumpsite and interim measures to manage the incoming waste until a new treatment facility is commissioned (e.g. baling of municipal solid waste); (ii) development a construction and demolition (C&D) waste treatment plant; (iii) island waste management centers in outer islands; and (iv) installing an appropriate collection and transfer system in Malé and other islands/resorts in Zone 3, including transfer stations in Malé and Villimale, (v) construct a disassembling plant for end-of-live vehicles, (vi) institutional capacity building and public awareness in sustainable SWM and reduce, reuse and recycling.

8. The state-owned Waste Management Company Ltd. (WAMCO) operates the waste collection in Malé, Hulhumale and Villimale and dumps waste on a dumpsite on the island of Thilafushi. On inhabited islands, the islands councils are in charge of collection and basic disposal. WAMCO took over the operational responsibility for waste management in December 2015.

9. The government also plans to i) rehabilitate the existing dumpsite in Thilafushi and ii) develop a transfer station in Hulhumale. The dumpsite rehabilitation invitation for bids is expected in the fourth quarter of 2020 or first quarter 2021. These two components are proposed to be financed on a parallel basis by the Islamic Development Bank.

B Objectives of the Assignment

10. To successfully implement the Greater Male Waste to Energy Project through high quality management, design and construction supervision, the government (executing agency and implementing agency also referred as the Client) will require the support of a professional engineering and management consulting firm (“the Consultant”). The firm will assist in the delivery of the different project components, which include the design, construction and initial operations (including capacity building of EPA and Employer in monitoring operations) of WTE facility and associated landfill of air pollution control residuals and non-marketable incineration bottom ash.

11. The Consultant will act as Employer’s Representative (ER, FIDIC Gold Book) during the design and build period and the first two years after the successful commissioning of the WTE plant (operation period).

C Scope

12. The Consultant's scope evolves from the roles and responsibilities stipulated in the relevant general conditions of the FIDIC Gold Book.

13. The Consultant is expected to provide inputs relating to the conceptual and detailed engineering and design reviews, construction supervision and contract administration, project management and monitoring, cost control, ensure compliance with social, environmental, occupational health and safety aspects, amongst others, provide capacity building support but not limited to the following:

    i. Ensure that the facilities and the equipment are designed according to the Employer's Requirements that are part of the DBO Contract;
    ii. Supervise, monitor and control the progress of design and construction of the WtE facility and the ancillary components in sufficient detail by, for example but not limited to, design reviews, inspection of manufacturing and construction sites, site meetings etc., as necessary and stipulated in the relevant contracts;
    iii. Monitor and manage any occurring interface during the construction activities of the Contractor and the contractor carrying out the dumpsite rehabilitation and minimize their impact on the timeline of the Project;
    iv. Supervise the construction of the new landfill and validate the bottom liner system construction Quality Assurance/Quality Management;
    v. Monitor and control the construction activities to minimize their environmental impact;
    vi. Monitor and control the commissioning and trial run operations including the tests on completion of the design-build period of the WtE plant including all ancillary facilities;
    vii. Support the Employer during processing of claims and invoices submitted by the contractors;
    viii. Assure that the contractor complies with relevant ADB safeguard standards;
    ix. Instruct and train the Employer's and EPA's staff in performance analyses and monitoring related to statutory compliance and to the performance guarantees of the WtE plant and its ancillary facilities;
    x. Draft a Joint Crediting Mechanism (JCM) methodology and support the Employer in registering the WtE facility for the GHG emission reductions;
    xi. Support the Employer during the first two years after of operation after issuing the commissioning certificate to monitor and review the performance of the DBO facilities.

D Responsibilities and Deliverables

14. The overall responsibility to deliver the outputs will rest with the consulting firm through the Team Leader/Project Manager. The Consultant will ensure timely delivery of the documents, establish coordination among all stakeholders and within the team members of the Consultant, scheduling mobilization/demobilization of team members and to interact with the Client on regular basis and as needed.

D.1 Project Management

15. Project management, control and monitoring responsibilities and tasks the Consultant will assume are as follows:

    i. Plan and manage the project, and assist the Employer on the project management, including risk management, cost control, scheduling, monitoring, auditing, reporting, and compliance monitoring for the project required under both the government and ADB rules

and guidelines;

ii. Review, comment and, if required, approve the Contractor's programs that are to be submitted including all pertinent activities and work packages, analyze critical paths, responsibilities and functions assigned and flag any time and cost over-run if required;
iii. Prepare a work programme for each of the Consultant's team members in line with the Contractor's schedule;
iv. Establish, coordinate and manage the information exchange between the Consultant, Contractor and the Employer and, as the case may be, other Project stakeholders;
v. Attend meetings necessary to manage the Project, prepare minutes and control the outcomes decisions taken;
vi. Establish a document control and proper filing system for project offices, including official correspondence, drawings, site instructions, variation orders and site records;
vii. Monitor open topics, claims of the Employer towards the Contractor, defects to be rectified, potential malfunctions of equipment etc. and track solutions to be implemented;
viii. Review and recommend on the Contractor's claims for progress payments;
ix. Review and examine the Contractor's requests for variation orders, extra items, new rates, claims for time extension and extra payment, filed by the contractor etc. and submit recommendations for approval, if appropriate;
x. Develop and implement procedures for timely payments to the Contractor and monitor for compliance;
xi. Assist constructively and submit recommendations in resolving any potential difficulty or dispute that may arise between the Contractor and the Employer;
xii. Prepare essential reports and documents including quick report on progress, quality, disbursement or any other relevant matter as may be required by the Client, Employer or the ADB and other funding institutions;
xiii. Assist the Employer in conducting regular meetings with all stakeholders, Contractor, and other government entities, etc., to discuss progress and issues related to implementation, and prepare minutes for recording and circulation;
xiv. Establish all necessary records and the procedures of maintaining/updating such records for each package and component of the Project;
xv. Assist on liaison with local authorities and government agencies, liaison with ADB and other funding institutions. Assist the Client/Employer in reporting to these institutions;
xvi. Review all proposed sub-contractors and verify their insurance, performance bond and collateral warranty or hereto relating parent company guarantees;
xvii. Assist the Client in ensuring compliance with all loan covenants during Project implementation and assist in reporting towards the funders.

16. Besides the responsibilities above, the Consultant will work closely with the Employer's project management unit by sharing relevant and requested information.

D.2 Review of the Design of the DBO Contract Components

17. The Consultant's responsibilities with respect to the design stages will include the review and approval of the proposed designs (submitted by the Contractor) including concept, detailed and works designs.

18. As per DBO Contract, the detailed design will be provided in packages to facilitate an appropriate design progress to develop the WtE facility and the residual waste landfill including permit application within 3.5 years. The Contractor may apply Building Information Modelling (BIM) to facilitate a smooth design and construction.

19. The Consultant's scope will include, but is not limited to, the following:

i. Review the design program of the Contractor with respect to feasibility, critical paths, achievement of milestones etc.
ii. Agree with the Contractor on the format and content to be delivered during the design stages, such as concept, detailed and works design, to achieve a timely delivery of the works included in the contract package;
iii. Assist the Employer in facilitating the Contractor to obtain the permit upon due consultation with the EPA, Ministry of Planning and Infrastructure, and key authorities or stakeholders;
iv. Agree with the Contractor on a defined conceptual design status in line with the milestones as per contract to limit variations during later design and construction stages;
v. Review, examine and, if required, approve during the different design stages (concept, detailed, works), drawings, design reports, calculations, technical specifications of equipment and materials etc., in due course as per phasing requirements that are stipulated in the DBO Contract;
vi. Check the design towards the functional and design criteria and specifications, H&S and environmental aspects, operability matters, flood and storm resilience, product quality and the supply chain to be established;
vii. Arrange and manage design review meetings in Malé to expedite and to facilitate a smooth design review;
viii. Monitor the design progress and inform the Employer about any deviations and potential delays;
ix. Suggest design changes if necessary and advise the Employer on these changes and potential cost and schedule implications by furnishing appropriate reports. In the event costs have to be borne by the Contractor, advise the Employer accordingly;
x. Review and, if needed, approve the contractor's method statements, site organization arrangements, utilities, shipment plans etc.;
xi. In the event procurement/manufacturing is carried out during the design stage, inspect or coordinate the inspection of manufacturing of critical components of the WtE plant as per contractual provisions incl. the review of certificates, technical specifications and workmanship;
xii. Check the hazard and operability (HazOp) analyses and hazard area classification drawings;
xiii. Review, comment and, as the case may be, approve the plans and documents the Contractor has to submit during the design-build phase, such as, but not limited to, operations and maintenance plan, the Contractor's environmental management plan (CEMP), quality management and assurance plan, the H&S plan, residual waste and landfilling plan, the programme on tests on completion of design-build, etc.; and
xiv. Ensure disaster- and climate-resilient features are incorporated in the final designs.

D.3 Construction Supervision

20. The Consultant will:

i. Review method statements, work drawings and construction methodology for their correctness and adequacy prior to the start of works, report findings and propose/recommend modifications or corrections to any defect or omissions and issue for execution; monitor impact and report on physical progress of the works and financial disbursements;

ii. Maintain sufficient site-based staff, with clear allocation of duties, to monitor, inspect and closely follow up the day-to-day construction activities in line with the timely requirements of the construction works;
iii. Maintain daily records of execution progress in an appropriate format to be shared with the Employer;
iv. Co-ordinate with all stakeholders to achieve timely completion of contractual obligations on the part of Contractor and the Employer;
v. Review any upcoming design changes in the course of the construction and advise the Employer on potential cost and design/construction schedule implications;
vi. Monitor the Contractors' performances against the stipulated milestones and the agreed project progress, furnish an updated list of open topics and advise the Employer about any expected or unexpected delay and potential cost implications;
vii. Check the adequacy and quality of the Contractor's input in terms of material, equipment & machinery, personnel and safety arrangements prior to commencement of the works and periodically during the construction activity;
viii. Inspect and control the executed works and the supplies of equipment to be in compliance with the approved work drawings (design for construction) and with the Employer's Requirements;
ix. Review, inspect and/or coordinate the review and inspection of manufacturers of major and critical components and their manufacturing sites pursuant to the Contract provisions with respect, but not limited, to certificates evidencing skills and experiences of workers, documented and certified materials used, technical specification of (sub)components embedded, the general workmanship and the final product quality;
x. Monitor the assembly of components and its progress towards expected milestones;
xi. Agree with the Contractor on the test programme prior to completion of the design-build, attend the tests, review the test reports and endorse test certificates;
xii. Review and approve the as-built-documentation and, as the case may be, request changes prior to acceptance;
xiii. Record and follow up on defects identified during the design-build period and ensure that all defects are remedied within the time stipulated;
xiv. Scrutinize the quality assurance system and quality control plan of the Contractor, prepare quality compliance and progress reports;
xv. Support and assist the Employer in Contract administration and compliance with contractual conditions and ADB's Project Administration Manual;
xvi. Support the Employer during the processing of payment and claims providing any necessary input (such as measurement of works progress, judgement and information concerning milestone achievements, acceptance of variation orders, deduction of retention money);
xvii. Assist the Employer in forecasting the progress of works and finalization of periodic targets for the expenditure and disbursement.

D.4 Commissioning Supervision

21. Responsibilities of the Consultant related to commissioning of the DBO contract components will include:

i. Maintain a sufficiently staffed and skilled team to keep up with the responsibilities assigned during the commissioning period including the demonstration of performance guarantees that were defined in the Contract;
ii. Support the Contractor, as far as required, to obtain the necessary permits to conduct

the commissioning activities;

iii. Assist the Employer in making available the required amount of waste prior to the tests on completion of the design-build;
iv. Review and approve the Contractor's test programme on the completion of the design-build and agree with the Contractor on a final programme;
v. Request to commission parts and sections of the works if need be;
vi. Attend and monitor the commissioning tests (incl. pre-commissioning) and trial operations including the tests on completion of design build to demonstrate the performance requirements, standards and guarantees;
vii. Furnish commissioning attendance protocols and highlight issues that might affect the scheduled tests on completion of design build;
viii. Review the test reports on completion of design-build and make necessary comments and adjustments, and, in the event of failure of the tests, request the Contractor to conduct a retest;
ix. Support the Employer during any claims related to the commissioning period;
x. After due consultation with the Employer, issue the commissioning *c*ertificate upon successful completion of the test on design build;
xi. Summarize the performance of the facilities being tested and give necessary instructions to the Employer and the EPA relating the performance monitoring and the compliance measurements.

D.5 Environmental and H&S Components

22. Responsibilities related to environmental, occupational health and safety are:

i. assist PMU in meeting requirements of ADB SPS and government on environment, occupational health and safety, and labor standards.
ii. assist PMU in obtaining all necessary permissions and complying with statutory requirements;
iii. ensure Contractor submits requirements per EMP and government clearances/permits,
iv. provide support to Contractor in preparing the Contractor's EMP (CEMP) to ensure ADB SPS and conditions in government clearances are incorporated accordingly;
v. assist PMU in updating the EIA for any change in scope, design, location, or unanticipated impacts that are not reported in the EIA;
vi. review any changes in the Contractor's design and support PMU in ensuring environmental assessment, impacts avoidance and mitigation measures are reflected in the CEMP and updated EIA
vii. assist the Contractor and the PMU in all EPA related clearances, and ADB's no-objection, and monitor and control construction and assembly compliance against the updated EIA, ADB's safeguards policy statement (2009), and CEMP;
viii. monitor the contractors' compliance with all safety requirements as stated in DBO contract and CEMP, during and prior to any construction activity.
ix. assist in preparation of accident report and keeping accident records on-site as required;
x. monitor the implementation of the CEMP during construction and pre/post construction phases;
xi. assist PMU in continuing stakeholders engagement, consultantations, information disclosure and addressing complaints/grievances;
xii. develop public awareness program and materials to support wider understanding of

the project, potential impacts and measures to ensure impacts are avoided, mitigated and affected people, if any, are compensated;

xiii. assist PMU in preparation of environmental monitoring reports
xiv. coordinate with external environmental experts on results of independent monitoring and support PMU to prepare corrective actions, if required
xv. provide and organize trainings/workshops/seminars on environmental safeguards, occupational health and safety, and labor standards
xvi. assist PMU in review of contractor's health and safety program and in monitoring its implementation
xvii. support PMU during ADB review missions
xviii. support PMU in developing data management system on environmental safeguards; and
xix. other tasks related to environmental safeguards, occupational health and safety, and labor standards

D.6 Capacity Building of EPA and the Employer's Personnel

23. Given the limited capacity of both the Employer's and EPA's staff to monitor the facility, the Consultant will provide training for the eligible MOE and EPA staff. The timing of the training activities will be aligned with the construction progress and the visits during the Operation Service Period to provide a firm understanding of the built facilities. The waste supplier's personnel will be included as far as necessary.

24. The Consultant's scope will cover the following aspects:

i. Prepare a training program for the Employer's and EPA's staff on monitoring the WtE plant and its ancillary facilities with respect to environmental compliance and best operational performance;
ii. Conduct induction training for the Employer and EPA amongst others on the following subjects relating the design:
    a) Technical design and construction characteristics of the WtE plant built and its ancillaries, particularly the furnace, boiler, turbine and APC system, landfill and leachate treatment;
    b) Continuous emission monitoring systems, its functionality and calibration;
    c) Access to the Plant Information Management System PIMS);
iii. Instruct the EPA and the Employer's staff on relevant H&S aspects, such as
    a) Fire hazards, safety, fighting and alarm system;
    b) Operating highly pressurized vessels;
    c) Handling chemicals, dust and toxic substances;
iv. Detail the operations and maintenance of a WtE plant, amongst others:
    a) Input control and fueling according to stoker capacity diagram and the hereto relating bottle necks (boiler, turbine, bottom ash quality etc.)
    b) Bunker management and mixing of waste for a steady state operations;
    c) Function and malfunction of the CEMS and how to detect those;
    d) Use of the SCADA (or DCS archives) and the interfaces to SCADA via the PIMS for a constant access of data;
    e) Necessary down times for inspection, revision or overhaul and typical annual maintenance schedule (incl. expenses) and its consequences towards the waste delivery;

v. Monitoring the facility is regarded as a primary task of both EPA and the Employer which makes it necessary to enhance the capacity in the following subjects:
   a) Reporting requirements towards the contractor;
   b) Scrutinizing regular reports, e.g. by assessing throughput, steam generation and flue gas volume vs. backwards calculated calorific value;
   c) How to utilize the access to archived SCADA data and to online data via the PIMS;
   d) Calibration records of essential components (weighbridge, crane scales, CEMS);
   e) Operational meetings on the facilities performance;
   f) Solving any potential conflicts prior to arbitration and what to tolerate and where to intervene.

vi. Contract management, such as performance guarantees and damages mechanisms, asset replacement fund utilization, milestones, timeframes for payments, dispute resolution etc.;

25. The training will be complemented by appropriate visits of the construction site and the operating plant to facilitate a better understanding of the characteristics of relevant components that are of a particular importance for EPA and the Employer (such as the continuous emission monitoring system, the APC system, the residue handling etc.).

D.7 Operation Service Period

26. The Consultant will be responsible within the first two years after issuing the commissioning certificate of the WTE facilities and components to assist the Employer to monitor and control the Contractor's performance amongst others in the following areas:

i. Follow up on a timely remediation of defects after issuing of the commissioning certificate and scrutinize the Contractor's final claim for reimbursement of the retention money as per DBO contract provisions;

ii. Assist the Employer in inspecting the facilities and reviewing their performance using the relevant data as per SCADA records or any other records to be made available by the Contractor with respect to
   a) the waste delivery (quality and quantity) and performance of WAMCO's C&D waste processing unit,
   b) the compliance to statutory requirements,
   c) the performance parameters and guarantees as per DBO contract,
   d) the production and quality of bottom ash and prospects of the bottom ash marketing;
   e) the production and contract compliant landfilling of APC residues;
   f) the consumption of supplies;
   g) scheduled down-times of the facility;
   h) the envisaged and applied maintenance;

iii. Suggest appropriate measures (e.g. within the DBO contract) in the event the Contractor fails to meet performance standards/guarantees;

iv. Advise the Employer of any issues identified during visits and suggest rectifications;

v. Prepare reports on each inspection visit;

vi. Upon reasonable request by the Employer, assist in solving occurring contractual issues arising out of the operations.

27. The responsibility of the Consultant will include two visits per year of appropriate staff of a duration of at least two weeks each to accommodate both the inspection and the training needs as per section D.6.

D.8 JFJCM Related Project Components

28. To apply for the Joint Crediting Mechanism (JCM), MoE will define the JCM methodology and prepare a project design document, and monitoring methodology that will be submitted for final approval and registration with the JCM. The Consultant will collaborate closely with MoE and take into consideration the requirements as defined in Annex 1. To obtain the approval, the Consultant will:

i. Draft JCM methodology for the proposed WtE and assist the project management unit (PMU) to have the methodology approved;
ii. Draft a project design document for the proposed JCM project, assist PMU to have the project design document validated, and have the project registered;
iii. Conduct a local stakeholder consultation (LSC) as required for the JCM process.
iv. Conduct a capacity building of the PMU to meet the requirement for the JFJCM including monitoring of GHG emission reductions, drafting a monitoring report, having the monitoring report verified, and requesting issuance of JCM credits;
v. Assist PMU to conduct monitoring and draft monitoring report, have the monitoring report verified, and request issuance of JCM credits;
vi. Train PMU staff in carrying out the JCM monitoring, reporting and verification process.

E Qualification Requirements for the Key Experts & Team Composition

29. **Expected qualification requirements and tasks assigned to the Key Experts:** The Consultant will provide experts to cover all aspects of the facilities as per the contractual agreements either being concluded already or to be tendered (e.g. fire engineering expertise). Because of the nature of a WtE facility, several experts may be required for the one or other field of expertise. It will be within the Consultant's discretion to name as many experts as deemed necessary to cover all elements of the WtE plant and its ancillaries that are subject of this DBO contract. The team composition and minimum requirements are as follow.

30. **Team Composition with estimated Input**: The Consultant team will comprise of International Key-experts (87 person-months), National Key-experts (76 person-months), and non-key experts (33 person-months) excluding those required for Consultant's administrative, clerical and support staff. The Consulting firm will be engaged for 5 years to cover 3.5 years for the DBO design-build and the first two years of the operation service period. The expert's positions with their estimated inputs are provided in Table 2 below.

Table 2: Team Composition