From: Sahulka, Danette <Danette.Sahulka@wsp.com>
Sent: August 14, 2023 1:10 PM
To: Mak, Jay <Jay.Mak@gov.mb.ca>
[redacted]
Subject: RE: 6179.00 - Monarch Colony questions and information

Hi Jay,

As requested, I have removed the confidential tag from the letter so that you may post it to the public registry.

Regards,
Danette

Danette Sahulka, M.Sc., B.Ed., P.Ag.
Lead Ecologist / Project Manager
Ecology and EIA, Earth and Environment

[redacted]

2023-07-24

Mr. Jay Mak, Senior Environmental Engineer
Land Use, Waste Management, and Energy Section
Environmental Approvals Branch
Department of Environment and Climate
Box 35, 14 Fultz Blvd, Winnipeg, MB R3Y 0L6

Subject: Response to Questions -Monarch Hutterite Colony Environment Act Proposal New Groundwater Well and Raw Water Pipeline System
Ref. No: Monarch Colony File Number 6179.00

Dear Sir:

This letter is provided as a response to questions outlined in your letter dated July 17, 2023, regarding the Environment Act Proposal (EAP) submission for the Monarch Hutterite Colony New Groundwater Well and Raw Water Pipeline System (File No. 6179.00).

RESPONSES TO QUESTIONS

Question 1 – Could you please confirm the legal name of the applicant to be used for licensing purposes?

Response – *Monarch Hutterite Colony.*

Question 2 – Could you please elaborate and provide the amount of greenhouse gases to be generated by the proposed development discussed in section 4.1 of the proposal.

Response – *Please see Greenhouse Gas Calculation (Attachment 1).*

TECHNICAL ADVISORY COMMITTEE (TAC) ADDITIONAL REQUIREMENTS

I provided the TAC members additional information to the WSP Project Manager (Mr. Mike Matview) to address in support of the project. A summary of the key items and their associated status (responses are italicized) are outlined below for your information (information current as of July 24, 2024).

General Items

- Monarch Colony must register with the Office of Drinking Water (ODW), and the project will require a permit (refer to point 1 on the letter from the EAB). *All documentation has been sent to ODW. Waiting for approval.*
- Water Rights License is required (refer to point 1 on the letter from the EAB). *Water Rights License is used to control water with dikes, surface drains, culverts, etc. We are not installing or constructing any of these items to install our water line, so we will not be applying for a water rights license.*

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- Wildlife Branch – construction needs to be avoided from March 15 – May 15 (for grouse) and April 15-Aug. 31 (for migratory birds) permit (refer to point 3 on the letter from the EAB). *Will advise contractor, but these dates should not be an issue.*
- The Historic Resources Branch (HRB) is requesting a Heritage Resources Protection Plan (HRPP) be developed for the project (refer to attachment AAS-23-20364). This requires submission of information following guidelines provided by the HRB (see attached). *WSP will develop a HRPP in support of the project and submit to the HRB. The EAB to be copied on correspondence.*

Municipal Approvals

- Need approval from the Prairie View Municipality for routing of pipelines through rights-of-way associated with municipal roads (refer to point 5a on the letter from the EAB). *The Municipality has reviewed the preliminary plans, with no concerns, WSP PM has sent them the final plans, as they will be preparing a Development Agreement with the Colony.*
- Contact the Development Officer of the Mid-West Planning district to determine need to apply for Development Permit (refer to point 5a on the letter from the EAB). *See response above.*

MB Transportation and Infrastructure (MTI)

- Contact MTI for any permits/approvals required for routing through provincial highway right-of-way (refer to point 5b on the letter from the EAB). *All plans have been submitted to MTI and approval has been received for the highway crossings.*
- Permit from MTI to construction new access, modify an existing or relocate access connections onto PR 568 (refer to point 6 on the letter from the EAB). *See response above.*
- Utility installations crossing PTH 42 and PR 568 will require permission/agreement from MTI. *See response above.*

Other

- Contact the following to determine if any other permits/approvals are required:
    - MB Office of Drinking Water (*submitted, waiting for approval*), Manitoba Environment and Climate *(not required)*, Manitoba Hydro *(approval not required for shallow bury utilities)*, Bell/MTS *(approval not required for shallow bury utilities)*, CP Rail *(submitted, waiting for approval)*, other public/private utilities (refer to point 5b on the letter from the EAB) *(approval not required for shallow bury utilities)*.

CLOSING

Should you have any further questions regarding this EAP submission, please contact me at your convenience.

Yours sincerely,

[redacted]

Danette Sahulka, M.Sc., P.Ag.
Lead Ecologist

DS/

cc: Mike Matview, Project Manager, WSP

Encl. Attachment 1 – Greenhouse Gas Calculation
WSP ref.: CA-WSP-221-10243-00

ATTACHMENT 1 – GREENHOUSE GAS CALCULATION:

Monarch Hutterite Colony Environment Act Proposal New Groundwater Well and Raw Water Pipeline System
File Number 6179.00

INTRODUCTION

There are ten primary greenhouse gases (GHGs) four of which are naturally occurring including water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Although water vapour is the most abundant and dominant GHG in the atmosphere, it is not used to assess GHG emissions as its presence is reliant on temperate and other meteorological circumstances and not directly from anthropogenic activities (Centre for Sustainable Systems, 2022)[1]. The main anthropogenic GHG that accounts for 78% of human contributions to the greenhouse effect is CO_2. Global Warming Potentials (GWPs) are used as a measure of the relative effectiveness of GHGs in trapping heat from the Earth over a certain time frame (Centre for Sustainable Systems, 2022). CO_2 is used as the reference gas for GWP and as such has a GWP = 1. Generally, GHG emissions are discussed in terms of mass of carbon dioxide equivalent (CO_2eq) which is calculated by multiplying the mass of emissions by the GWP for the gas (Centre for Sustainable Systems, 2022).

Canada's total GHG emission in 2021 were estimated to be 670 megatonnes (Mt) of CO_2eq (Environment and Natural Resources, 2023)[2]. According to the chart of greenhouse gas emissions by economic sector for Canada between the years 1990 to 2021, in 2021 the "waste and others" sector (consists of emissions from light manufacturing, construction, forest resources and coal production) produced a total of 47.0 Mt CO_2eq (Environment and Natural Resources, 2023), which equates to approximately 7% of the total GHG emissions produced in Canada in 2021. In comparison, Manitoba's total GHG emissions in 2021 were 20.7 Mt of CO_2eq or 3% of the national average (Environment and Natural Resources, 2023). Table 1 below provides comparative values of GHG production by other Canadian economic sectors in 2021.

[1] Centre for Sustainable Systems, University of Michigan. 2002. Greenhouse Gases Factsheet, Pub. No. CSS05-21. Retrieved online at: https://css.umich.edu/sites/default/files/2022-09/GHG_CSS05-21.pdf (retrieved August 1, 2023).

[2] Environment and Natural Resources, Environmental Indicators. 2023. Greenhouse gas emissions. Retrieved online at: https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html#transport (retrieved August 1, 2023).

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Table 1. Greenhouse Gas Emission by Economic Sector, Canada, 2021 (Environment and Natural Resources, 2023)

Canadian Economic Sector	Total Canadian Mt CO_2eq Emissions	% of Total
Oil and Gas	189.2	28.2
Transport	150.1	22.4
Buildings	87.2	13.0
Electricity	51.7	7.7
Heavy Industry	76.8	11.5
Agriculture	68.5	10.2
Waste and Others	47.0	7.0
TOTAL	**670.5**	**100.0**

METHODOLGY

To assess the greenhouse gas (GHG) emissions that may be produced during construction activities associated with the development of a new groundwater well and installation of a raw water conveyance pipeline for the Monarch Hutterite Colony, WSP utilized an online GHG calculation tool – the Mobile Combustion GHG Emissions Calculation Tool (World Resources Institute, 2015) [3].

Assumptions

Several assumptions/estimations were made to support input decisions for the online GHG calculation tool as follows:

1. The WSP Project Manager provided an estimate of the anticipated type of equipment to be used for project construction, the anticipated hours per day of equipment use, and the total number days of equipment use (refer to Table 2).
2. Two sets of equipment (i.e., two crews) are anticipated to be used during the construction period.
3. Fuel used by equipment was assumed to be diesel.
4. Construction equipment average hourly fuel consumption was obtained from equipment specifications obtained from online sources (refer to Appendix A – Equipment Specifications) or online forums.
    a. Where a range of fuel consumption rates were provided in the equipment specifications, the average rate was used for the GHG calculation.
    b. Where fuel consumption was provided in the equipment specifications based on a low, medium and high duty level, the fuel consumption provided for the medium duty level was utilized.

[3] Reference: World Resources Institute (2015) GHG Protocol tool for mobile combustion. Version 2.6. Retrieved online at: https://ghgprotocol.org/calculation-tools-and-guidance (retrieved August 1, 2023).

Table 2. Construction Equipment Type and Anticipated Total Fuel Used

Equipment	Fuel Type	Fuel Efficiency (gal/hr)	Total Number of Operating Hours per Day	Total Number of Operating Days	Number of Equipment Units (Crews) Used	Total Fuel Used (gal)	Total Fuel Used (L)
John Deere 250 GLC	Diesel	2.0	12	50	2	2,400	9,085
Caterpillar D6T LGP	Diesel	4.8	12	50	2	5,760	21,804
Caterpillar 950 H	Diesel	3.4	12	50	2	4,080	15,444
Volvo A30D	Diesel	3.9	12	50	2	4,680	17,716
Hitachi ZX200	Diesel	2.7	12	50	2	3,240	12,265

Notes:
gal = US gallons
hr = hour
L = Litres

GHG Calculations

Information from Table 2 above was entered into the Activity Data sheet of the GHG Emissions Calculation Tool (refer to Appendix B) to determine the total GHG emissions produced by heavy equipment during project construction (installation of groundwater well and raw water pipeline).

RESULTS

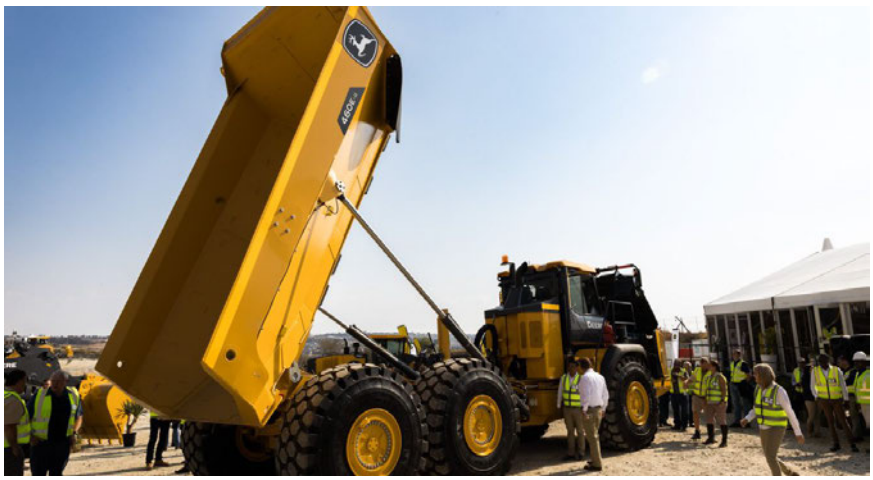
According to the GHG Emissions Calculation Tool (refer to Appendix B), the total GHG emissions anticipated to be produced during project construction is 206.34 metric tonnes CO_2eq or 0.000206 Mt CO_2eq (refer to Table 3). This equates to 0.001% of the total GHGs emissions recorded for Manitoba in 2021.

Table 3. Summary of GHG Calculation for Project Construction

Equipment	Total Fuel Used (L)	Fossil Fuel CO_2 (metric tonnes)	CH_4 (kg)	N_2O (kg)	Total GHG Emissions (metric tonnes CO_2eq)	Total GHG Emissions (Mt* CO_2eq)	Manitoba Total GHG Emissions 2021 (Mt* CO_2eq)	Canadian "Waste and Other" Sector Emissions 2021 (Mt* CO_2eq)
John Deere 250 GLC	9,085	24.360	1.392	0.624	24.564	0.000025		
Caterpillar D6T LGP	21,804	58.464	3.341	1.498	58.954	0.000059		
Caterpillar 950 H	15,444	41.411	2.366	1.061	41.758	0.000042		
Volvo A30D	17,716	47.503	2.714	1.217	47.901	0.000048		
Hitachi ZX200	12,265	32.887	1.879	0.842	33.163	0.000033		
TOTAL	**76,314**	**204.62**	**11.69**	**5.24**	**206.34**	**0.000206**	**20.7**	**47.0**

Notes:
L = Litres
kg = kilograms
*1 Mt is equal to 1,000,000 metric tonnes

APPENDIX A – EQUIPMENT SPECIFICATIONS



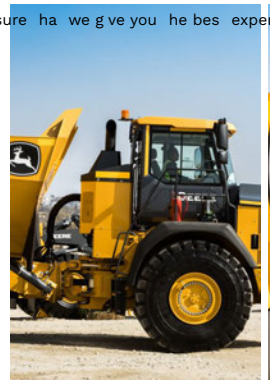
Increase Your Productivity and Reduce Your Operating Costs

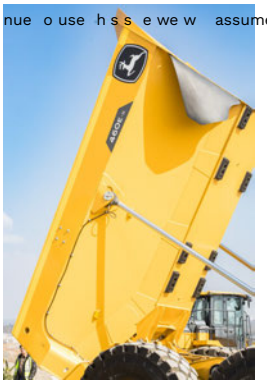
September 5 2022 (https://afgr equ pment.co.za/2022/09/05/) / by Monet Van Eeden (https://afgr equ pment.co.za/author/monet van eden/)

he John Dee e 460E A t cu ated Dump uck (https://afg equ pment.co.za/afg -equ pment-const uct on/a t cu ated-dump-t ucks/) a ved n South Af ca n Ju y 2022 and ou c ents we e p om sed **MORE** tons moved , **MORE** fue economy and **MORE** ope ato comfo t. John Dee e AD s (https://afg equ pment.co.za/afg -equ pment-const uct on/a t cu ated-dump-t ucks/) de ve mp ess ve powe and to que fo except ona powe -to-we ght at o and fast cyc es. So you can keep wo k ng on:

- steep s opes,
- th ough deep uts,
- and on s ppe y su faces.

We have been demonst at ng th s A t cu ated Dump uck (https://afg equ pment.co.za/afg -equ pment-const uct on/a t cu ated-dump-t ucks/) and we, as we as ou c nts a e amazed at the esu ts that th s p oduct on c ass mach ne de ve s. Resu ts f om ou on-s te tests a e n, howeve the esu ts a e based on, and spec fic to ope at ng cond t ons.



Reduce Fuel Consumption

Acco d ng to the nfo mat on ava ab e, the fue consumpt on s an ave age of 15.04 t es pe hou , wh ch s 2 t es owe than the ndust y standa d of 17 t es pe hou (compet to mach nes on the same s te).

he John Dee e 460E- (https://afg equ pment.co.za/afg -equ pment-const uct on/a t cu ated-dump-t ucks/)has th ee d ve modes ava ab e on the 460E- AD (https://afg equ pment.co.za/afg -equ pment-const uct on/a t cu ated-dump-t ucks/) to he p opt m se the d vet a n, educe nput act ons f om the ope ato , and enab e easy custom sat on based on the ob whethe t be a m ne, qua y o const uct on s te.

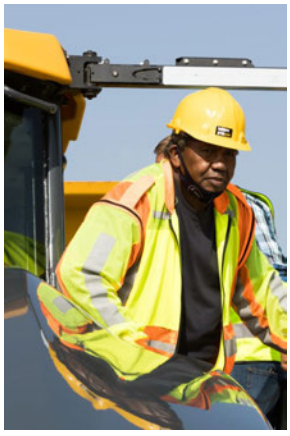
1. Normal mode fo eve yday ope at on **reduces fuel burn by up to 7%** compa ed to othe John Dee e AD 's (https://afg equ pment.co.za/afg -equ pment-const uct on/a t cu ated-dump-t ucks/).

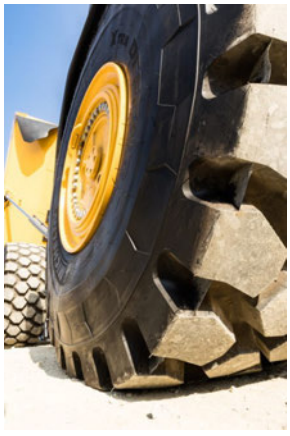
2.Eco mode, when cond t ons a ow, saves fue by manag ng eng ne powe de ve y and opt m s ng t ansm ss on esponse fo those cond t ons, mp ov ng fue economy by up to 12% compa ed to No ma Mode.

3. Traction mode opt m ses d ffe ent a ock fo max mum t act ve effo t n soft OR s ppe y g ound cond t ons.

he new whee -speed senso s a so p ov de a mo e accu ate ead ng than g ound-speed ada to confi m the t act on-boost ng auto-d ffe ent a ock engagements when needed.

W th these modes, you ope at on w save fue costs and he p educe you ope at on's env onmenta mpact.





Make your Operator Comfortable

he ope ato s a e amazed at how qu et the mach nes ope ate, acco d ng to them t's "mo e comfo tab e than d v ng a ca ."

FUEL CONSUMPTION TABLES AND LOAD FACTOR GUIDES

TRACK-TYPE TRACTORS

Model	Low		Medium		High	
	liter	U.S. gal	liter	U.S. gal	liter	U.S. gal
D3K2[3]	7.6	2.0	8.7	2.3	15.5	4.1
D4K2[3]	8.3	2.2	9.5	2.5	15.9	4.2
D5K2[3]	8.7	2.3	9.9	2.6	16.7	4.4
D3K2[1]	6.8	1.8	7.6	2.0	15.2	4.0
D4K2[1]	7.6	2.0	8.3	2.2	15.5	4.1
D5K2[1]	8.0	2.1	8.7	2.3	15.9	4.2
D5R	12.1-15.1	3.2-4.0	15.1-20.0	4.0-5.3	20.0-26.4	5.3-6.9
D6K2[3]	—	—	12.0	3.2	—	—
D6K2[1]	—	—	11.3	3.0	—	—
D6N[3]	12.1-15.1	3.2-4.0	15.1-20.0	4.0-5.3	20.0-26.4	5.3-6.9
D6N[2]	9.9-13.3	2.6-3.5	13.3-17.5	3.5-4.6	17.5-24.9	4.6-6.6
D6R (130 kW/175 hp)	13.2-18.9	3.5-5.0	18.9-24.6	5.0-6.5	24.6-30.3	6.5-8.0
D6R (145 kW/195 hp)	14.8-21.2	3.9-5.6	21.2-27.3	5.6-7.2	27.3-33.7	7.2-8.9
D6T (138 kW/185 hp)	15.5-22.3	4.1-5.9	22.3-28.8	5.9-7.6	28.8-35.6	7.6-9.4
D6T[1]	15.0-21.3	4.0-5.6	21.3-27.7	5.6-7.3	27.7-34.0	7.3-9.0
D7E[1]	13.6-19.3	3.6-5.1	19.3-25.2	5.1-6.7	25.2-31.8	6.7-8.4
D7R	17.8-24.4	4.7-6.5	24.4-31.0	6.5-8.2	31.0-37.6	8.2-9.9
D8R	22.5-32.0	6.0-8.5	32.0-41.5	8.5-11.0	41.5-51.0	11.0-13.5
D8T[3]	23.5-33.7	6.2-8.9	33.7-43.5	8.9-11.5	43.9-53.7	11.6-14.2
D8T[1]	23.7-34.3	6.3-9.1	34.3-44.2	9.1-11.7	44.1-54.2	11.7-14.3
D9T[3]	30.3-43.1	8.0-11.4	43.1-56.4	11.4-14.9	56.4-69.3	14.9-18.3
D9T[4]	28.2-40.1	7.4-10.6	40.1-52.5	10.6-13.9	52.5-64.4	13.9-17.0
D9T[1]	31.2-44.4	8.2-11.7	44.4-58.1	11.7-15.3	58.1-71.4	15.3-18.9
D10T2[6]	39.5-56.3	10.4-14.9	56.3-73.3	14.9-19.4	73.3-90.2	19.4-23.9
D10T2[5]	43.0-61.3	11.4-16.3	61.3-79.8	16.3-21.1	79.8-98.2	21.1-26.0
D11T[6]	59.6-85.2	15.8-22.5	85.2-110.7	22.5-29.3	110.7-136.3	29.3-36.0
D11T[5]	60.3-86.1	15.9-22.8	86.1-112.0	22.8-29.6	112.0-137.8	29.6-36.4

[1] Meets U.S. EPA Tier 4 Final/EU Stage IV/Japan 2014 (Tier 4 Final) emission standards — Calculations include DEF.
[2] Meets Tier 4 Interim/Stage IIIB/Japan 2011 (Tier 4 Interim) equivalent emission standards.
[3] Meets Tier 3/Stage IIIA/Japan 2006 (Tier 3) equivalent emission standards.
[4] Meets Tier 2/Stage II/Japan 2001(Tier 2) equivalent emission standards.
[5] Meets Tier 4 Final emission standards.
[6] Meets Tier 2 equivalent emission standards.

Typical Application Description
(relative to work application)

Low — Pulling scrapers, most agricultural drawbar, stockpile, coal pile and finish grade applications. No impact. Intermittent full throttle operation.

Medium — Production dozing in clays, sands, gravels. Push loading scrapers, borrow pit ripping, most land clearing applications. Medium impact conditions. Production landfill work.

High — Heavy rock ripping. Push loading and dozing in hard rock. Working on rock surfaces. Continuous high impact conditions.

Load Factor Guide
(average engine load factor based on application description for each range)

Low 35%-50%
Medium 50%-65%
High 65%-80%

Product Link™ Information — Product link measured over hundreds of Track-Type Tractors shows that more than 90% of the machines experience an average fuel consumption equal to or lower than those shown in the Medium Application profile.

FUEL CONSUMPTION TABLES & LOAD FACTOR GUIDES

TRACK-TYPE TRACTORS

Model	Low		Medium		High	
	liter	U.S. gal	liter	U.S. gal	liter	U.S. gal
D3C & LGP Series III	4-7½	**1-2**	7½-11	**2-3**	9½-13	**2½-3½**
D4C & LGP Series III	5½-9½	**1½-2½**	9½-13	**2½-3½**	11-15	**3-4**
D5C & LGP Series III	5½-9½	**1½-2½**	9½-13	**2½-3½**	13-17	**3½-4½**
D4E	5½-9½	**1½-2½**	9½-13	**2½-3½**	11-15	**3-4**
D5M XL & LGP	6-10½	**1½-3**	10½-14½	**3-4**	12½-17	**3½-4½**
D5B	9½-13	**2½-3½**	11-17	**3-4½**	15-21	**4-5½**
D6M XL & LGP	11-15	**3-4**	12½-19½	**3½-5**	17-24	**4½-6½**
D6G	11-20½	**3½-5**	15½-21	**4-6**	23-28½	**6-7½**
D6R XL, XR & LGP	13-22½	**3½-6**	17½-25	**4½-6½**	25-30½	**6½-8½**
D7G Series II*	19-25	**5-6½**	26-34	**7-9**	32-40	**8½-10½**
D7R XR & LGP	19-23	**5-6**	25-28	**6½-7½**	32-36	**8½-10**
D8R & LGP	23-28	**6-7½**	28-38	**7½-10**	38-51	**10-13½**
D9R	36-47	**9½-12½**	47-58	**12½-15½**	60-76	**16-20**
D10R	44-59	**11½-15½**	59-76	**15½-20**	76-93	**20-24½**
D11R	62-87	**16½-23**	87-112	**23-29½**	112-134	**29½-35½**

*D7G fuel consumption data is based on a precombustion chamber equipped engine. Fuel consumption for a direct injection equipped D7G should be approximately 10% less.

AGRICULTURAL TRACTORS

Model	Low		Medium		High	
	liter	U.S. gal	liter	U.S. gal	liter	U.S. gal
D4E SR	5½-9½	**1½-2½**	9½-13	**2½-3½**	11-15	**3-4**
D6G SR	11-19	**3-5**	15-21	**4-5½**	21-26	**5½-7**
Challenger 35	9½-21	**2½-5½**	21-32	**5½-8½**	32-42	**8½-11**
Challenger 45	9½-23	**2½-6**	23-38	**6-10**	38-45	**10-12**
Challenger 55	11-26	**3-7**	26-42	**7-11**	42-53	**11-14**
Challenger 65E	34-42	**9-11**	42-49	**11-13**	49-61	**13-16**
Challenger 75E	34-42	**9-11**	42-49	**11-13**	53-64	**14-17**
Challenger 85E	34-42	**9-11**	42-53	**11-14**	53-61	**14-16**
Challenger 95E	34-42	**9-11**	45-57	**12-15**	57-72	**15-19**

LOAD FACTOR GUIDE

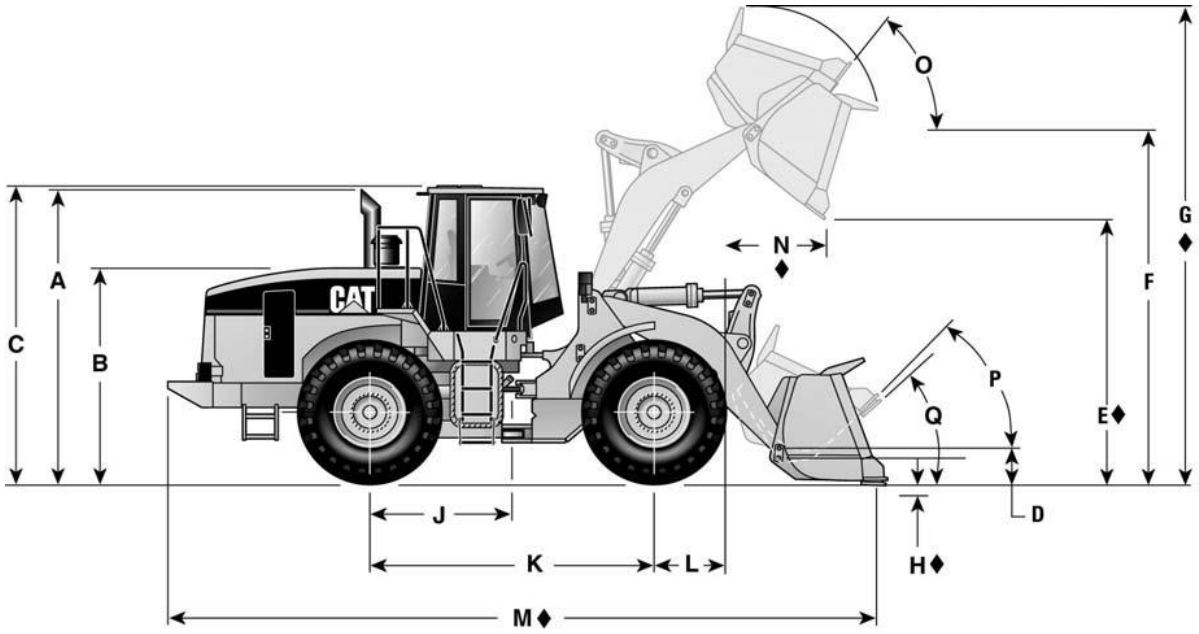
High: Steady ripping, shuttle pushloading and downhill dozing. Agricultural drawbar work at full throttle, engine lugged to max. power most of the time. Little or no idling or travel in reverse.

Medium: Production dozing, pulling scrapers, most pushloading. Agricultural drawbar work at full throttle but not always lugging engine. Some idling and some travel with no load.

Low: Considerable idling or travel with no load.

Cat 950H Wheel Loader

Fuel Burn	Low duty	Medium Duty	High Duty
L/hr	7.9 – 11.4	11.4 – 14.7	14.7 – 18.5



Dimension	**Description**	**Measurement**
A	Height to top of Stack	3.37m
B	Height to top of engine compartment	2.46m
C	Height to top of ROPS	3.45m
D	Hinge pin height at carry position	.455m
E	Dump clearance at full lift and 45* discharge angle	2.92m
F	Hinge pin height at full lift	3.99m
G	Maximum overall height	5.44m
H	Maximum digging depth	.092m
J	Machine centre point to axle	1.68m
K	Wheel base	3.35m
L	Radius of tire	.835m
M	Maximum overall length	7.99m
N	Reach at full tilt	1.202m
O	Maximum rollback at maximum lift	59*
P	Maximum rollback at carry height	45*
Q	Maximum rollback at ground	39*
	Ground Clearance	.412m
	Tread width	2.14m
	Width over tyres	2.78m

Specifications

Item	Specification
Flywheel Power Gross	161 kW
Engine Model	C7 ATAAC
Rated Engine RPM	1800
No Cylinders	6
Max forward speed	37.0 km/h
Max reverse speed	40.0 km/h
Hydraulic cycle time (raise, dump, lower)	10.0 sec
Fuel tank Capacity	314L
Hydraulic tank Capacity	110L

Performance Data

Item	Measurement
Bucket Capacity (heaped)	2.9m3
Operating Load at rated capacity	5290 kg
Struck capacity	2.5m3
Tipping load straight	12 276kg
Static tipping load full turn	10 581kg
Breakout force	164 kN
Operating weight	18 145kg

HITACHI

Hitachi Fuel Advantage

Frequently Asked Questions (FAQ)

Hitachi is committed to providing our customers with products that deliver productivity, uptime and low daily operating costs. The Hitachi Fuel Advantage program ("Program") is designed to help you optimize your Hitachi equipment fleet's fuel consumption by providing increased visibility to machine utilization data and identify opportunities for improvement.

Below are answers to some frequently asked questions about the Program, including what machines are eligible for enrollment, fuel consumption target levels and how the Hitachi Fuel Advantage Program Reward ("Reward") is calculated.

THE PROGRAM

What is the Hitachi Fuel Advantage Program?

The Program has two primary components: 1) Detailed quarterly machine utilization reports; and 2) Our Hitachi Fuel Advantage commitment.

What machine models are eligible to enroll in the Program?

The following new, never retailed machine models that are less than three (3) years old are eligible to enroll in the Program (an "Eligible Machine"):

What are the Hitachi Fuel Advantage target fuel consumption levels?

See table (right) for target fuel consumption levels in gallons/liters by eligible machine models.

Machine Family	Machine Model	Gallon/hr	Liter/hr
Excavators	ZX130-5	1.9	7.2
	ZX135US-5	1.9	7.2
	ZX160GLC-5	2.4	9.0
	ZX180LC-5	2.4	9.0
	ZX190W-3	2.3	9.0
	ZX190W-5	2.3	9.0
	ZX210LC-5	3.1	11.7
	ZX220W-3	2.7	9.9
	ZX230W-5	2.7	9.9
	ZX245USLC-5	3.3	12.6
	ZX250LC-5	4.0	15.3
	ZX250LC-6	4.0	15.3
	ZX300LC-6	4.9	18.9
	ZX350LC-5	6.3	23.4
	ZX350LC-6	6.3	23.4
	ZX380LC-5	6.3	23.4
	ZX380LC-6	6.3	23.4
	ZX470LC-5	8.1	30.6
	ZX470LC-6	8.1	30.6
	ZX670LC-5	11.2	42.3
	ZX670LC-6	11.2	42.3
	ZX870LC-5	13.5	51.3
	ZX870LC-6	13.5	51.3

APPENDIX B – MOBILE COMBUSTION GHG EMISSIONS CALCULATION TOOL

GREENHOUSE GAS PROTOCOL

Mobile Combustion
GHG Emissions Calculation Tool
Version 2.6

Introduction

This tool calculates the CO2, CH4 and N2O emissions from:

- Vehicles that are owned/controlled by you, including freight lorries.
- Public transport by road, rail, air and water.
- Mobile machinery, such as agricultural and construction equipment.

The tool uses default emission factors, which vary by country. Currently, separate sets of emission factors are available for the UK and US. For other countries, if more specific emission factors are not available, companies should select the 'Other' category. This category uses either global default values or UK-specific values -- it will therefore lead to less accurate calculations. On the settings tab, users can supply custom emission factors or adjust the default global warming potentials.

What data do I need?

Fuel use data are most accurate for calculating CO2 emissions, while distance-traveled data are most accurate for calculating CH4 and N2O emissions. So, for non-public transport sources, the recommended approach is to provide both fuel use and distance data. Where one type of data is unavailable, the tool uses fuel economy information (where available) to convert between these data types. Because CO2 contributes most to GHG emissions (>95%), companies should first strive to improve their fuel use records.

Please note that the emission from on-road freight transport can be calculated using vehicle distance or weight-distance data.

Start Here

Select the action that you'd like to perform below:

Enter Activity Data

Set Up GWP & Custom Emission Factor

View Summary

Notes

Multipliers or other corrections to account for radiative forcing may be applied to the GWP of emissions arising from aircraft transport. If used, this should be documented in the inventory report.

The emission factors used in this tool come from the UK Dept. for Environment, Food and Rural Affairs (DEFRA), the US Environmental Protection Agency (EPA) and the Intergovernmental Panel on Climate Change's (IPCC) 2006 Guidelines for National Greenhouse Gas Inventories. The tool was developed by Clear Standards Inc. in collaboration with WRI.

Please cite this tool using the following format:
World Resources Institute (2015). GHG Protocol tool for mobile combustion. Version 2.6.

While the worksheets are largely self explanatory, for questions or suggestions on its contents, please contact the GHG Protocol at: ghgquestions@wri.org

GREENHOUSE GAS PROTOCOL

otal GHG Emis ions exclude Biofuel CO2 (metric tonnes CO2e)	206 3 1
Biofuel CO2 Emissions (met ic tonnes)	0

Activity Data

The default emission factors are sourced from the US EPA Cl mate Leaders program or from the UK DEFRA (for air ravel on y).

Status	Source Description	Region	Mode of ransport	Scope	ype of Activity Da a	Ac iv ty Data								Error Messages	GHG Emissions				
						Vehicle ype(For air transport, see footnote)	Distance ravel ed	o al Weight of Fre ght	# of Passenger	Un ts of Measurement	Fuel Used	Fuel Amount	Unit of Fuel Amount		Fossil Fuel CO2 (metric onnes)	CH4 (k lograms)	N2O (kilog ams)	o al GHG Emissions exclude Bio uel CO2 (metr c tonnes CO2e)	Biofuel CO2 Emissions (metr c tonnes)
	ole Dee e 250 8 C	US	Road	Scope	uel Use	Const uct on Equipment - Diesel uel					On-Road Diesel uel	8065	l e		24 360	383	0 624	24 566	0
	Ca e pi la D8 G	US	Road	Scope	uel Use	Const uct on Equipment - Diesel uel					On-Road Diesel uel	2 804	l e		58 464	3 34	486	58 604	0
	Ca e pi la 980 H	US	Road	Scope	uel Use	Const uct on Equipment - Diesel uel					On-Road Diesel uel	5444	l e		4 4	2 366	38	4 758	0
	Volvo A30D	US	Road	Scope	uel Use	Const uct on Equipment - Diesel uel					On-Road Diesel uel	77 6	l e		47 803	2 7 6	2 7	47 90	0
	Hitachi ZX220	US	Road	Scope	uel Use	Const uct on Equipment - Diesel uel					On-Road Diesel uel	2065	l e		32 887	878	0 642	33 43	0

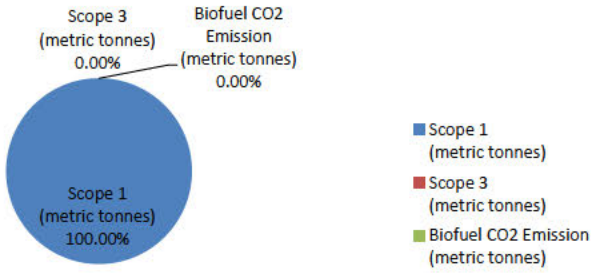
													otal (metric onnes CO2e)	20 .62	11.695	5 2 2	206.3 1	0

Air Tra

* P ease note the fol owing d stance categor ies when calcu ating air transport emissions.
Domestic = < 63 km
Short-haul = > 63 <1108 km
Long haul =≥ 1108 km

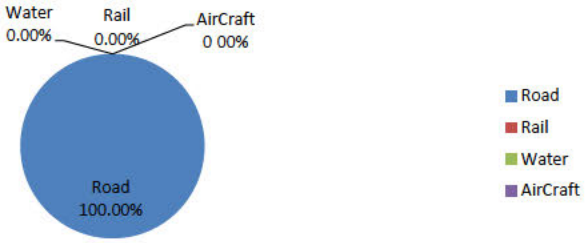
GREENHOUSE GAS PROTOCOL

Summary: Emissions by Scope



Calculation Method	Greenhouse gas	Fossil Fuel Emissions		Biofuel CO2 Emission (metric tonnes)
		Scope 1 (metric tonnes)	Scope 3 (metric tonnes)	
Fuel Use	CO2	204 624	0	0
	CH4	0 012	0	
	N2O	0 005	0	
Distance	CO2	0	0	0
	CH4	0	0	
	N2O	0	0	
Total (metric tonnes CO2e)		206.479	0	0

Summary: Emissions by Mode of Transport



Mode of Transport	Scope	Fossil Fuel Emissions			Biofuel CO2 Emission (metric tonnes)
		Fossil Fuel CO2 (metric tonnes)	CH4 (kilograms)	N2O (kilograms)	
Road	Scope 1	204 624	11 693	5.242	0
	Scope 3	0	0	0	
Rail	Scope 1	0	0	0	0
	Scope 3	0	0	0	
Water	Scope 1	0	0	0	0
	Scope 3	0	0	0	
AirCraft	Scope 1	0	0	0	0
	Scope 3	0	0	0	

Total Emissions	204.624	11.693	5.242	0
Total GHG Emission (metric tonnes CO2e)	206.479			