SCHOOL A

M&V PLAN ACCORDING TO THE IPMVP 2014

PREPARED BY

ESCO

FULL M&V PLAN

SEPTEMBER 2014

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BACKGROUND AND FACILITY'S DESCRIPTION

The *School A* is located in downtown Québec (Canada), and each year it receives over 1,000 students registered in different programs. The programs offered in this institution are grouped in the following categories:

- Motorized equipment;
- Leather, textile and clothing;
- Restaurant and catering.

In addition to administrative offices and classes, the building houses engineering workshops, garages, kitchens, a restaurant and a semi-Olympic sized swimming pool. The engineering workshops and garages cover more that 20% of the building's total surface area, and the kitchens—including the bakeries, pastry areas and butcher's—use almost 10% of the total surface area. Appendix I presents the inventory of the building's heating, ventilation, and air conditioning systems (HVAC) as well as that of its compressors and domestic water heaters.

Table 1: Description of the School A

Year constructed	**1968**
Surface area	24,577 m^2
Energy sources and uses	➢ Electricity • Lighting • Ventilation • Air conditioning • Compressors • Welding equipment • Computer hardware • Other ➢ Natural gas • Boilers and direct-fired air heaters
Type of heating	Hot water and direct-fired air heaters
Energy consumption at reporting period	50,114 GJ
Energy intensity at reporting period	1.76 GJ/m^2

1 ENERGY CONSERVATION MEASURES

The following section presents the energy conservation measures that will be implemented as part of this project and the expected savings calculated by the ESCO.

Table 2: List of Energy Conservation Measures

	ECM	Description	Annual Savings
1	Optimization of auditorium ventilation system controls	The addition of variable frequency drives will enable air flow into the auditorium to be controlled. To reduce the energy the fans consume, air flow will be adjusted according to auditorium occupancy. A CO_2 sensor will ensure a minimum fresh air flow. It will also enable zone damper controls to be adjusted, which will reduce fresh air intake into the CA-1 system.	$2,236
2	Optimization of garage ventilation system controls	The addition of variable frequency drives will enable air flow into the garage to be controlled. For the safety of the garage users, air volume will be adjusted based on carbon monoxide (CO) and nitrogen dioxide (NO_2) levels. The system will also adjust flow depending on whether the exhaust collector is on and the room's motion detector is activated.	$53,112
3	Optimization of cafeteria ventilation system controls	Variable frequency drives will be added to reduce air flow into this room. Flow will be controlled based on cafeteria occupancy and vent hood use. To optimize the system, motion detectors, CO_2 sensors and zone dampers will be installed.	$925
4	Optimization of body shop ventilation system controls	Existing equipment will be replaced with a variable frequency drive system. Heating will be provided by a glycol coil connected to the low-temperature system. The system can be used to pressurize the hall to avoid spreading contaminants to other sectors. A motion detector in the room will determine when the system operates.	$29,982
5	Optimization of gym ventilation system controls	Motion detector, CO_2 sensor and zone damper systems will be added to optimize fresh air input.	$6,231
6	Heat recovery and air preheating in	The recovery system will be connected to the low-temperature system, which will enable the	$14,780

	ECM	Description	Annual Savings
	the A-15, A-16 and A-17 systems	building's domestic water to be preheated.	
7	Temperature reduction with night setback	Temperature set points will be lowered at night by 2 ℃—a very conservative value. If this reduction does not cause building users any discomfort or inconvenience, the building manager will further lower temperature set points.	$4,512
8	Hot water supply system temperature adjustment	The existing hot water system will be converted into a variable flow system in each zone.	$62,232
9	Variable displacement pump in the peripheral heating system	The entire high-temperature hot water system will be controlled through the building's energy management system. Water temperature will be tightly controlled through temperature sensors to reduce system loss. Differential pressure sensors will lower the pumping system flow rate by about 40%.	
10	Heating of the high-temperature hot water system with an electric boiler	This measure proposes adding an electric boiler for off-peak heating. Using an instant power reading, a 300 kW or so electric boiler will be able to feed hot water into the system during off-peak hours.	
11	Heating of the low-temperature system with a heat pump	An air-to-water heat pump system will be installed. To maximize the system's operating range and capacity, outside air will be mixed with air from the building's exhaust systems. The installation of a solar wall is planned, which will preheat the outside air used by the heat pumps.	$33,708
12	Mechanical pool dehumidifier and heat recovery	This measure proposes replacing the DA-1 system with an energy-recovering mechanical dehumidifier as well as replacing the existing ventilation system. The dehumidifier will recover energy that can be used to heat the space in winter and mid-season. It will also heat the pool water and one of the heating systems if needed.	$23,267

The following table summarizes the savings expected from this project as estimated by the ESCO.

Table 3: Estimate of Total Project Savings

	Annual Consumption Before	Annual Consumption After	Savings	Savings	Savings
Electricity	4,715,280 kWh	6,318,475 kWh	-1,603,195 kWh	-$ 124,404	-34%
Natural gas	874,601 m^3	116,453 m^3	760,903 m^3	$ 353,153	87%
Total	50,114 GJ	27,055 GJ	23,059 GJ	$ 228,749	46%

2 MEASUREMENT OPTION AND BOUNDARY

IPMVP Option Used to Determine Savings
Option C According to the IPMVP, Volume I

Justification of the Selected Option, Gain/Reporting Period Ratio
The measurement option for the whole facility was chosen because the energy providers' meters are used to assess the energy performance of the whole facility. This option determines collective savings for all energy conservation measures (ECMs) implemented.

Measurement Boundary
Option C: Whole Facility

3 BASELINE: PERIOD, ENERGY AND CONDITIONS

3.1 IDENTIFICATION OF THE BASELINE PERIOD

The baseline period starts on July 1, 2010, and ends on June 30, 2011, corresponding to a one-year period.

3.2 BASELINE ELECTRICITY CONSUMPTION AND DEMAND

Baseline electricity consumption and demand data come from actual readings shown on Hydro-Québec invoices.

The following table presents the baseline electricity consumption and demand.

Table 4: Facility's Baseline Electricity Consumption and Demand

Billing Period		Electricity Consumption
From	To	kWh
2010-07-01	2010-07-31	321,120
2010-08-01	2010-08-31	335,520
2010-09-01	2010-09-30	412,560
2010-10-01	2010-10-31	394,560
2010-11-01	2010-11-30	424,080
2010-12-01	2010-12-31	409,680
2011-01-01	2011-01-31	431,280
2011-02-01	2011-02-28	418,320
2011-03-01	2011-03-31	433,440
2011-04-01	2011-04-30	393,120
2011-05-01	2011-05-31	401,760
2011-06-01	2011-06-30	339,840
Total		**4,715,280**

3.3 BASELINE NATURAL GAS CONSUMPTION

Baseline natural gas consumption data come from actual readings shown on Gaz Métro invoices. The table below presents the baseline natural gas consumption.

Table 5: Facility's Baseline Natural Gas Consumption

Billing Period		Natural Gas Consumption
From	To	m^3
2010-06-25	2010-07-26	7,970
2010-07-27	2010-08-24	12,244
2010-08-25	2010-09-23	26,441
2010-09-24	2010-10-25	49,478
2010-10-26	2010-11-23	78,797
2010-11-24	2010-12-21	112,010
2010-12-22	2011-01-26	159,910
2011-01-27	2011-02-23	144,722
2011-02-24	2011-03-24	119,151
2011-03-25	2011-04-25	87,995
2011-04-26	2011-05-25	50,595
2011-05-26	2011-06-26	25,288
Total		**874,601**

3.4 INDEPENDENT VARIABLES

Independent variables include factors that can affect the facility's energy consumption or demand and that will be systematically included to determine the periodic adjustment of the baseline during the reporting period.

For electricity consumption, the relevant independent variables are the heating degree-days (HDD) and the number of class days, as shown in Table 6. For natural gas consumption, the relevant independent variables are the heating degree-days (HDD), as shown in Table 7.

Heating degree-days are calculated on a reference of 18°C, using data from Québec's Jean Lesage International Airport (YQB) weather station.[1] The number of class days comes from the School A school calendar.

Table 6: Independent Variables for Electricity Consumption

Period		Heating Degree-Days (°C)	Number of class days
From	To		
2010-07-01	2010-07-31	12.7	0
2010-08-01	2010-08-31	19.4	6
2010-09-01	2010-09-30	147.6	20
2010-10-01	2010-10-31	353.4	20
2010-11-01	2010-11-30	526.7	20
2010-12-01	2010-12-31	767.5	15.5
2011-01-01	2011-01-31	876.0	14
2011-02-01	2011-02-28	773.7	18
2011-03-01	2011-03-31	696.8	17
2011-04-01	2011-04-30	436.3	15
2011-05-01	2011-05-31	220.9	17.5
2011-06-01	2011-06-30	54.2	0
Total		**4,885**	**163**

[1] National Climate Data and Information Archive, Environment Canada, www.climate.weatheroffice.gc.ca/

Table 7: Independent Variables for Natural Gas Consumption

Period		Heating Degree-Days
From	To	℃
2010-06-25	2010-07-26	19.4
2010-07-27	2010-08-24	22.1
2010-08-25	2010-09-23	109.6
2010-09-24	2010-10-25	321.8
2010-10-26	2010-11-23	447.2
2010-11-24	2010-12-21	670.2
2010-12-22	2011-01-26	982.8
2011-01-27	2011-02-23	778.2
2011-02-24	2011-03-24	690.1
2011-03-25	2011-04-25	530.1
2011-04-26	2011-05-25	248.0
2011-05-26	2011-06-26	78.1
Total		**4,898**

3.5 BASELINE STATIC FACTORS

Static factors include equipment and operating modes that are considered fixed during the M&V plan preparation. Thus, no adjustment calculation is anticipated in the M&V plan for these factors. However, if a change occurs in the data and parameters, the baseline must be adjusted (permanently or temporarily).

The list below identifies a series of static factors to be monitored for this project.

Table 8: Static factors

Static factors	Source of Data
Building or area utilization	Detailed feasibility study of the energy efficiency project and floor drawings
Building occupancy rate	Detailed feasibility study of the energy efficiency project
Building floor area	Floor drawings
Number and capacity of heating, ventilation, and air conditioning systems (HVAC)	Appendices 1 and 2 of the present M&V plan
Building standards and legislation governing ambient conditions	Client's conditions
Building utilization schedule	Appendix 2 of the present M&V plan and detailed feasibility study of the energy efficiency project
Hours of operation of HVAC systems	Appendix 2 of the present M&V plan
Lighting hours of operations	Detailed feasibility study of the energy efficiency project
Outdoor air supply rate	Detailed feasibility study of the energy efficiency project
Temperature setpoints	Detailed feasibility study of the energy efficiency project
Hot and chilled water temperature	Detailed feasibility study of the energy efficiency project

The project's static factors include information gathered on the building before project implementation. These should not affect the implemented measures. Appendices I and II present the inventories and schedules of the building's main HVAC systems.

4 REPORTING PERIOD

The reporting period starts after ECM implementation. The reporting period is indeterminate, and reconciliation will be performed in the long term. A one-year reporting period corresponds to a period of 12 consecutive months. The reporting period starts on the date of substantial completion of implemented ECMs.

5 DESCRIPTION OF THE BASELINE ADJUSTMENT METHODOLOGY

The following section presents the methods for baseline adjustment according to changes in independent variables and static factors.

5.1 BASIS FOR ADJUSTMENT

Retained Option	Equation
Avoided energy use (or energy savings)	Avoided energy use = Baseline energy (±) **Routine** adjustments to reporting period conditions (±) **Non-routine** adjustments to reporting period conditions (-) Reporting period energy
Avoided demand	Avoided Demand = Baseline demand (±) **Routine** adjustments to reporting period conditions (±) **Non-routine** adjustments to reporting period conditions (-) Reporting period energy

In the avoided energy use equation, the calculation of “baseline energy” and “routine adjustments” will be performed simultaneously through the baseline mathematical model. The same applies to the avoided demand calculation.

5.2 ROUTINE ADJUSTMENTS

For each energy source, mathematical models allow baseline adjustments according to relevant independent variables. This section presents appropriate mathematical models for electricity and natural gas.

5.2.1 Electricity

Baseline electricity consumption data are adjusted according to the following equation:

$$y = 56.59\ x_1 + 3{,}274\ x_2 + 325{,}430$$

where

y = Adjusted electricity consumption (kWh);

x_1 = Heating degree-days (°C);

x_2 = Number of class days;

325,430 = Baseline consumption (kWh).

The regression analysis is considered satisfactory according to generally accepted standards for this type of analysis. The following table presents statistical indicators for this regression.

Table 9: Regression Analysis Statistics for Electricity

Multiple Coefficient of Determination	Value	Recommendations
Coefficient of determination (R^2)	0.92	> 0.75
Coefficient of variation of the RMSE	0.030	< 0.2
t-statistic (for variable x_1)	4.15	< -2 or > 2
t-statistic (for variable x_2)	5.58	< -2 or > 2
t-statistic (for baseline consumption)	43.39	< -2 or > 2

5.2.3 Natural Gas

Baseline natural gas consumption data are adjusted according to the following equation:

$$y = 159.73\ x_1 + 7{,}692$$

where

y = Adjusted natural gas consumption (m^3);

x_1 = Heating degree-days (°C);

7,692 = Baseline consumption (kWh).

The regression analysis is considered satisfactory according to generally accepted standards for this type of analysis. The following table presents statistical indicators for this regression.

Table 10: Regression Analysis Statistics for Natural Gas

Multiple Coefficient of Determination	Value	Recommendations
Coefficient of determination (R^2)	0.99	> 0.75
Coefficient of variation of the RMSE	0.082	< 0.2
t-statistic (for variable x_1)	5.58	< -2 or > 2
t-statistic (for baseline consumption)	2.72	< -2 or > 2

5.3 NON-ROUTINE ADJUSTMENTS

Baseline adjustment in case of equipment addition/removal/shutdown or change in operation

In the event that the facility adds/removes/shuts down equipment or changes its operations, data will be collected from drawings and specifications, equipment specifications, manufacturer and contractor information and/or short-term measurement campaigns. The procedure will be based on the impact of such changes on static factors. The new devices' operating hours may be estimated, at the client's convenience, based on the type of use.

Adjustments will be defined either as temporary (applicable to a portion of the reporting period) or permanent (remains in effect for the rest of the reporting period).

6 ENERGY PRICE ADJUSTMENTS

Cost savings are determined by applying the appropriate price schedule in the following equation:

$$\textbf{Cost savings} = C_b - C_r$$

where

C_b = Cost of baseline energy plus any routine or non-routine adjustments;

C_r = Cost of reporting period energy plus any routine or non-routine adjustments.

Cost savings should be determined by applying the same price schedule when computing both C_b and C_r.

Electricity: Electricity consumption costs used for savings calculation (baseline or reporting period) are based on Hydro-Québec's Rate M effective during the reporting period.

Natural gas: Natural gas consumption costs used for savings calculation (baseline or reporting period) are based on the natural gas rates and costs effective during the reporting period.

In case of a significant energy rate increase, no ceiling price has been established.

7 METER SPECIFICATIONS

For Option C, the main meters measuring total building energy consumption and demand are as follows:

- Electricity: Hydro-Québec meter (075-EL-M-1)
- Natural gas: Gaz Métro meter (075-GA-1S-1)

These meters are deemed to comply with IPMVP requirements, without any additional validation.

8 MONITORING RESPONSIBILITIES

Table 11: Monitoring Responsibilities – Energy Data

Person in Charge	Data	Frequency
School A: **Mr. White** **Facility Controller, Material Resource Services**	Hydro-Québec meter	Monthly
	Gaz Métro meter	

Table 12: Monitoring Responsibilities – Independent Variables

Person in Charge	Data	Frequency
ESCO: **Mr. Brown** **Eng., Technical Expert**	Heating degree-days, data collected from Environment Canada	Monthly
	Number of class days, data collected from the School A school calendars	Annually

Table 13: Monitoring Responsibilities – Static Factors

Person in Charge	Data	Frequency
Commission scolaire de la Capitale: **Mr. White** **Facility Controller, Material Resource Services**	Changes in occupancy schedules	Monthly
	Changes in systems schedules	
	Equipment addition/removal/shutdown in the building	Addition: 5 days after Removal: 5 days before Shutdown: Once a month

9 EXPECTED ACCURACY

Accuracy on savings has been calculated as per appendices attached (see files: uncertaintytest BEHRER GAS.xls and uncertaintytest BEHRER ELEC.xls).

A) Hypothesis:

1) Confidence level: 90 %. It has been agreed that 10% of all measurements may fall out of the uncertainty bandwidth : the confidence interval, as expressed below.

2) Metering uncertainties :

As per chapter 7 , the meters are official utility meters. Therefore, in accordance with IPMVP, we consider them as 100% accurate and do not combine any metering uncertainty component in our uncertainty propagation equation.

3) Weather and occupation data

Weather data is collected from an official reference weather source, close enough to the location of each school, so that there is no remarkable gap between locations' average monthly degree day reports and less than 5% daily differences. Hence we have agreed that no uncertainty will be considered.

4) Number of Class-days

This data has been collected from school's official reports and are considered exact by both parties: it has been agreed that possible reporting or recording errors are negligible, by comparison of the model uncertainty.

B) Method

The IPMVP Annex B method has been applied, considering a post retrofit period of twelve month. In addition, the ASHRAE 14 simplified equation has been computed in order to cross check the results.

C) Results

Energy	Expected accuracy on guaranteed savings	Confidence interval on Guaranteed savings (Sa)	Confidence Level
Gas	+/- 7%	93% **<=Sa=>** 81%	90%
Electricity	+/- 6%	36% **<=Sa=>** 32%	90%

10 REPORT RESPONSIBILITIES

Person in Charge	ESCO
Frequency	Annually
Date of Transmission	**Fifteen days following the receipt of Hydro-Québec and Gaz Métro invoices**

11 BUDGET

	Instrumentation	Readings/Analysis/Report
Baseline Period	$0 (Providers' meters are already in place)	$2,500
Reporting Period		**$2,000/year**

Savings will be calculated on the basis of Option C and will use energy providers' meters already in place (Hydro-Québec and Gaz Métro). However, around $52,000 will be allotted for submetering implementation, to monitor four natural gas pipelines and twelve 600 V electrical panels. Submetering will serve several purposes:

- To ensure savings are attained for all ECMs described in section 1;
- To perform accurate adjustments, such as for new equipment additions not provided for in this current project;
- To detect poor performance early.

A $2,000/year budget has to be set aside for savings monitoring.

12 FORMAT OF THE M&V REPORT

M&V report for the School A

Date

1. Facility consumption and demand data (utility bills)
    a. Electricity consumption and demand data
    b. Natural gas consumption data
    c. Summary chart of facility consumptions and demands
2. Baseline period adjustment data
    a. Independent variables
    b. Static factors
3. Readjusted baseline period calculation
4. Energy savings calculations (kWh, m^3 and $)
5. Evaluation of cumulative savings from the start of the project, on a yearly basis

13 QUALITY ASSURANCE

The following procedure will be used to ensure the quality of the energy savings calculations and all other related activities in preparing the reports.

- Only professionals with Certified Measurement and Verification Professional (CMVP) certification may calculate the savings and adjustments. Moreover, all savings calculations will be based on fundamental engineering principles and performed to the best of the knowledge of the professionals involved. Each calculation will be verified by another person who knows the project and has the required skills.
- All savings calculations will be based on the energy data (electricity, natural gas, oil, etc.) from the copies of the bills from the energy suppliers, like Hydro-Québec and Gaz Métro.
- Each calculation will be verified by the qualified person in charge of doing so
- Independent variables: All meteorological data will come from Environment Canada, more specifically, from the weather station located nearest to the project site, at Québec's Jean Lesage International Airport (YQB).[2]
- Static factor: Information related to project static factor changes will be sent by the project's internal supervisor (client) to be analyzed by the CMVP-accredited professional to determine the direct and indirect impacts on projected savings. This professional will then be able to make the necessary adjustments for the reference year to determine the real savings of the measures implemented.
- To minimize errors in energy data entries, will be double-checked. The second verification will be carried out by another representative.

[2] National Climate Data and Information Archive, Environment Canada, www.climate.weatheroffice.gc.ca/

APPENDIX I
HVAC SYSTEMS INVENTORY AT THE SCHOOL A

Table 14: Heating System Inventory

Brand	Model	Capacity	Service Area
De Dietrich	GT 413 (natural gas)	645 kW	General heating
Volcano	JB4C-50-EP170-M30-MP-ULC (natural gas)	3,693 kW	General heating
Volcano	JB4C-50-EP170-M30-MP-ULC (natural gas)	3,693 kW	General heating
Volcano	4B-25C-D11R (natural gas)	245 kW	Steam distribution system

Table 15: Air Conditioning System Inventory

Brand	Type	Condenser Model	Evaporator Model
Mitsubishi Electric	Mini-split	PU18EK 1	PK18FK 1
Mitsubishi Electric	Mini-split	PUY-A36NHA3	PCA-A36GA
Mitsubishi Electric	Mini-split	PUY-A36NHA3	PCA-A36GA
Trane	Rooftop	YCD150EWVAAA	-
Mitsubishi Electric	Mini-split	PUY-A36NHA3	PCA-A36GA2
Mitsubishi Electric	Mini-split	PUY-A36NHA3	PCA-A36GA
Rheem	Split	RAKA-030JAZ	-
Rheem	Split	RAKB-048JAZ	-
Eubank	Mini-split	-	TFW75
Eubank	Mini-split	TRS45-6	MSS-018B
Eubank	Mini-split	MSS-018A	TFW45
Heat Controller	Mini-split	MSS-018A	MSS-018B
Trane	Split	2TTB0060A1000AA	-
Trane	Split	2TTB060060A1000AA	-
Trane	Split	2TTB0048A1000AA	-
Trane	Rooftop	TCD120BW0ADB	-

Brand	Type	Condenser Model	Evaporator Model
LG	Mini-split	LS-K2430CL	LS-K2430CL
Trane	Split	2TTR2024A1000AA	-
Trane	Rooftop	TSC120AWE0A0ND0000000	-
Trane	Rooftop	TSC092AWE0A0PD00000000 000 D	-
Trane	Rooftop	TSC092AWE0A0PD0000000	-
Trane	Rooftop	TCD060CW0ABD	-
Trane	Rooftop	TCD150EW0AAA	-

Table 16: Ventilation System Inventory

Brand	Model	Power	Service Area
Enmar Systems Limited	-	11.2 kW	Car painting room
Bousquet	SDM-150-LH-BDD-LMN-C	7.5 kW	Car painting room
Bousquet	SDM-200-RH-BDD-MN-C-MV	14.9 kW	Body shop
Canada Fans	98-NH	11.2 kW	Auditorium
Canada Fans	LM-150	19.4 kW	Gym
Mark-Hot	KH57	29.8 kW	Diesel engineering
Canada Fans	108 1/2 NH	19.4 kW	Gym
Trane	MCCA017GAN0ABA	11.2 kW	Swimming pool
Trane	MCCA017GAN0ABA	11.2 kW	Swimming pool
Bousquet	SDM-75-LH-BDD-LMN-C-MV	4.5 kW	Body shop
Bousquet	SDM-100-LH-BDD-MN-C	7.5 kW	Body shop
AAON	RM-A04-4-0-0000-13A	0.7 kW	Body shop
Trane	TCD120BW0ADB	1.5 kW	Body shop
Trane	TSC120AWE0A0ND0	2.2 kW	Diesel class
Bousquet	SDM-BDD-LMN-C	6.0 kW	Diesel welding
Trane	TSC092AWE0A0PD0	1.5 kW	Sewing
Trane	TCD150EW0AAA	2.2 kW	Automotive mechanics

Brand	Model	Power	Service Area
			class
Trane	TCD060CW0ABD	4.5 kW	Chrysler local
Trane	TSC092AWE0A0PD0	1.5 kW	Sewing
Mark-Hot	-	29.8 kW	Automotive mechanics
Canada Fans	-	0.4 kW	Crawl space
Canada Fans	-	0.4 kW	Crawl space
Aerofoil Fan	-	1.5 kW	Crawl space
PVC	Centrex	1.1 kW	Body shop crawl space

Table 17: Compressor Inventory

Brand	Model	Power
Ingersoll-Rand	10TE	7.5 kW
Ingersoll-Rand	MK.10.H.8	7.5 kW
Champion	-	3.7 kW
Champion	-	11.2 kW
Ingersoll-Rand	71T2-10E	7.5 kW

Table 18: Domestic Water Heater Inventory

Brand	Model
Thermo 2000	RETW 100-9
Thermo 2000	RETW 100-9

APPENDIX II
MAIN SYSTEMS OPERATING SCHEDULES AT THE SCHOOL A

System	Service Area	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AR9	Kitchen	-	06:00-19:30	06:00-19:30	06:00-19:30	06:00-19:30	06:00-19:30	-
Chiller	Kitchen	-	05:00-18:30	05:00-18:30	05:00-18:30	05:00-18:30	05:00-18:30	-
A15	Kitchen	-	05:15-16:00	05:15-16:00	05:15-16:00	05:15-16:00	05:15-16:00	-
AR1	Kitchen	-	06:15-16:00	06:15-16:00	06:15-16:00	06:15-16:00	06:15-16:00	-
AR2	Kitchen	-	07:00-16:00	07:00-16:00	07:00-16:00	07:00-16:00	07:00-16:00	-
A3R	Kitchen	-	03:45-16:00	03:45-16:00	03:45-16:00	03:45-16:00	03:45-16:00	-
AR4-A2	Kitchen	-	06:15-16:00	06:15-16:00	06:15-16:00	06:15-16:00	06:15-16:00	-
E05B	Kitchen	-	07:15-22:15	07:15-22:15	07:15-22:15	07:15-22:15	07:15-22:15	-
AR5	Kitchen	-	06:45-16:00	06:45-16:00	06:45-16:00	06:45-16:00	06:45-16:00	-
A07A	Kitchen	-	07:00-16:00	07:00-16:00	07:00-16:00	07:00-16:00	07:00-16:00	-
AR6	Butcher's	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00
A4	Kitchen	-	07:00-16:00	07:00-16:00	07:00-16:00	07:00-16:00	07:00-16:00	-
AR7	Kitchen	-	07:00-22:00	07:00-22:00	07:00-22:00	07:00-22:00	07:00-22:00	-
AR8	Kitchen	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00
AR10	Kitchen ADM	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00
AR11	Cafeteria	-	05:00-16:00	05:00-16:00	05:00-16:00	05:00-16:00	05:00-16:00	-
A16	Kitchen	-	06:45-16:00	06:45-16:00	06:45-16:00	06:45-16:00	06:45-16:00	-
A17	Kitchen	-	05:15-16:00	05:15-16:00	05:15-16:00	05:15-16:00	05:15-16:00	-
A18	Kitchen	-	06:00-18:00	06:00-18:00	06:00-18:00	06:00-18:00	06:00-18:00	06:00-18:00
CA9	Diesel	-	06:15-23:00	06:15-23:00	06:15-23:00	06:15-23:00	06:15-23:00	06:15-19:00
CA8	Diesel	-	05:30-22:30	05:30-22:30	05:30-22:30	05:30-22:30	05:30-22:30	-
CE25	Diesel	-	05:30-22:30	05:30-22:30	05:30-22:30	05:30-22:30	05:30-22:30	-
CE29	Diesel	-	06:30-22:30	06:30-22:30	06:30-22:30	06:30-22:30	06:30-17:45	-
Exhaust roof	Diesel	-	07:30-22:30	07:30-22:30	07:30-22:30	07:30-22:30	07:30-18:30	-
CA2	Gym	-	07:00-21:30	07:00-21:30	07:00-21:30	07:00-21:30	07:00-21:30	-
Air conditioning	Diesel class	-	06:00-22:45	06:00-22:45	06:00-22:45	06:00-22:45	06:00-18:00	-
Split magasin	Diesel	-	06:45-22:45	06:45-22:45	06:45-22:45	06:45-22:45	06:45-18:00	-
BA2	Auto	-	05:45-22:30	05:45-22:30	05:45-22:30	05:45-22:30	05:45-17:45	-

System	Service Area	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
BA15	Auto	-	05:45-22:30	05:45-22:30	05:45-22:30	05:45-22:30	05:45-17:45	-
B17	Auto	-	04:30-22:45	04:30-22:45	04:30-22:45	04:30-22:45	04:30-18:15	-
B18	Auto	-	05:15-22:30	05:15-22:30	05:15-22:30	05:15-22:30	05:15-18:30	-
CE1	Exhaust. toil. diesel	-	07:00-19:00	07:00-19:00	07:00-19:00	07:00-19:00	07:00-19:00	-
BE12	Exhaust. toil. auto	-	07:15-22:45	07:15-22:45	07:15-22:45	07:15-22:45	07:15-17:30	-
AC8	Air con auto	-	07:00-22:30	07:00-22:30	07:00-22:30	07:00-22:30	07:00-22:30	
Split 217	Auto	-	06:30-22:30	06:30-22:30	06:30-22:30	06:30-22:30	06:30-22:30	-
Air con sewing	South	-	06:30-17:00	06:30-17:00	06:30-17:00	06:30-17:00	06:30-17:00	-
Air con sewing	South	-	06:30-17:00	06:30-17:00	06:30-17:00	06:30-17:00	06:30-17:00	-
Split 217	Auto	-	06:30-22:30	06:30-22:30	06:30-22:30	06:30-22:30	06:30-17:30	-
Split class	Auto	-	06:30-22:45	06:30-22:45	06:30-22:45	06:30-22:45	06:30-17:00	-
Sector	Body shop	13:30-16:45	04:00-22:30	04:00-22:30	04:00-22:30	04:00-22:30	04:00-22:30	13:30-16:45
CA1	Auditorium.	Operates according to calendar needs, 00:00-24:00, average 1–2 days/week						