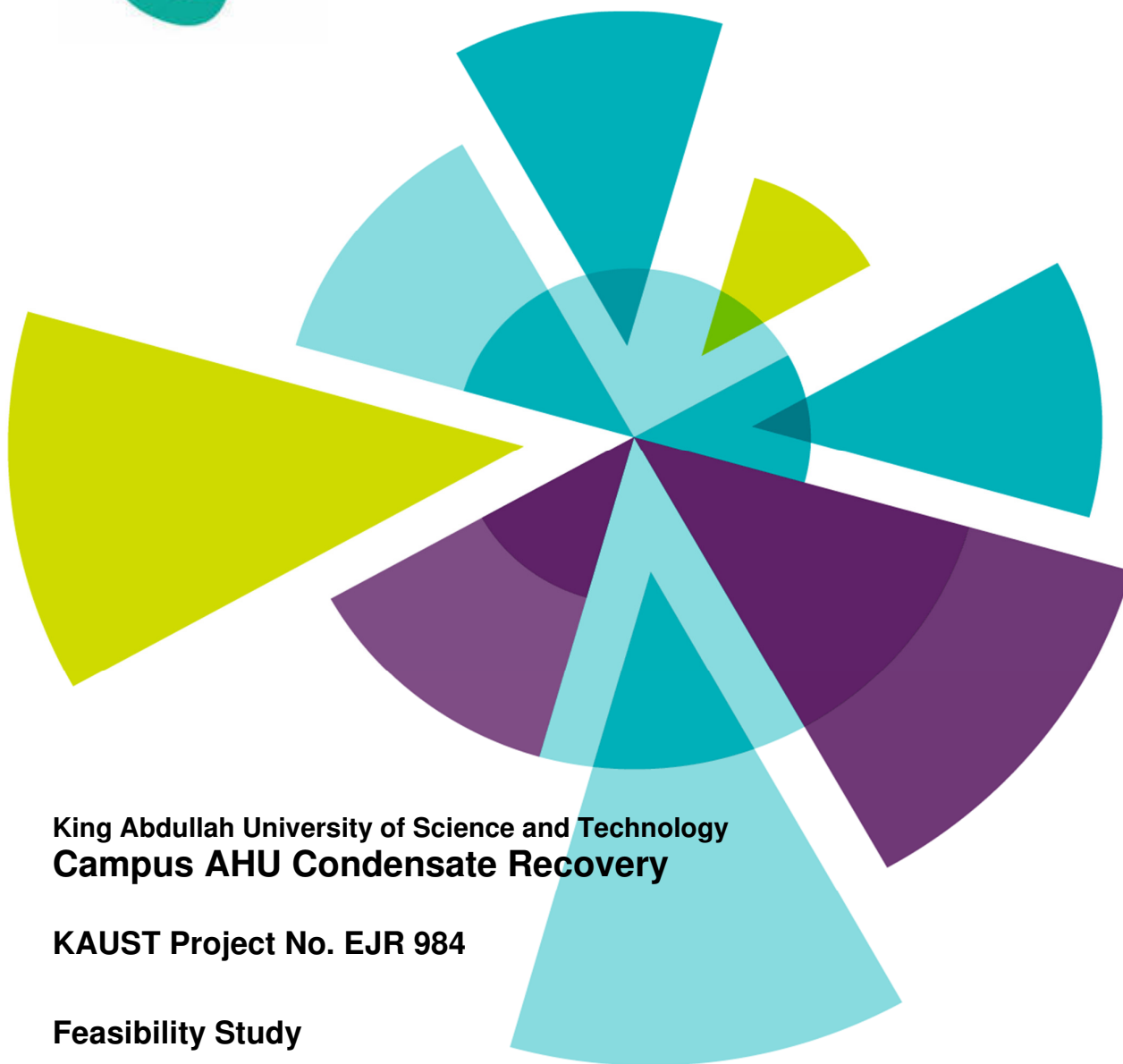




**King Abdullah University of Science and Technology
Campus AHU Condensate Recovery**

KAUST Project No. EJR 984

Feasibility Study

Document No.: P15KAU01-000-REP-M-001 Rev C0

Amec Foster Wheeler Australia Pty Ltd
12 August 2016

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C0	12/08/16	Updated based on Client Review Comments	PM	MS	FJ	
B0	27/05/16	Client Review	PM	MS	FJ	
REV	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	CLIENT APPROVAL

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1 INTRODUCTION

1.1 Project Brief

Established in 2009, KAUST is a LEED platinum university in Thuwal, KSA. Following an internal study, the department of University Support Services has decided to further explore the feasibility of capturing the condensation generated from the campus Air Handling Units (AHU's).

This project is focused on the potential use of reclaimed condensation from Buildings 2, 3, 4 and 5 for campus landscaping, and to assess the benefit of a pilot programme that uses condensation to reduce the amount of potable water used to irrigate the West quadrant of the campus horseshoe.

1.2 Project Scope

The intent of this feasibility study is to assess the volume of condensate generated, and the proposed design and indicative cost of a recovery system for reuse of condensate for campus irrigation.

2 CALCULATION METHODS AND RESULTS

2.1 Basis of Calculations

The following documentation was provided to AMEC Foster Wheeler in order to form the basis of the calculations described below;

- Report 'EJR 984_AHU Condensate Study'
- AHU schedules 'BLDG02_UN2300', 'BLDG03_UN2400', 'BLDG04_UN2600', 'BLDG05_UN2700'.
- Weather data file 'ST TEMP RH.XLSX'.
- Drawings '1024-289-External CWW-01'
- Water quality report of the analysis for site condensate water
- Off coil temperature for AHU5016 at Building 3.xls

2.2 Monthly Hourly Average Condensate

Using both mechanical air handling technical schedules and local weather data provided from March 2015 to March 2016, the monthly hourly average of condensate removed for the given month can be calculated.

Client data provided verified that a constant coil air off temperature is maintained consistent with the equipment schedules. Once this has been established, the amount of condensate removed (L) from each typical AHU within Buildings 2, 3, 4 and 5 per month was calculated based on the minimum and maximum outside airflow for a typical AHU. This calculation was then expanded to show the amount of condensate removed for all AHU's per monthly hourly average within a typical building.

Due to the performance of the energy wheel within the AHU(s), condensate calculations revealed that a constant condensate recovery rate occurred between the months of March and November, in which ambient conditions had no effect on the amount of condensate produced. However the condensate produced between the months of December to February was found to be based on ambient conditions, resulting in a fluctuating and on occasions minimal rate of condensate produced.

Refer to Appendix 4 for Buildings 2, 3, 4 and 5 Monthly Hourly Average condensation removal results.

2.3 Peak Condensate

From the monthly hourly average data, the peak condensation flow could be established for Buildings 2, 3, 4 and 5.

Refer to Appendix 5 for Buildings 2, 3, 4 and 5 Peak Condensation removal results.

3 FEASIBILITY FOR CONDENSATE RECOVERY SYSTEM

3.1 Proposed System Design

The proposed system shown in Appendix 4 and 5 illustrates the strategy for capturing and recycling condensate for re-use within the existing irrigation systems.

The Horseshoe area is separated into 4 discrete irrigation zones, each with a separate cold water supply to an irrigation control valve box. To minimize pipework and excavation, the condensate drainage collection points have been grouped to correspond to the nearest irrigation zone, shown as North, South, East and West Areas. Each system will consist of a condensate collection sump and pump at each building condensate drainage point, in ground pipework from each collection sump, a main condensate storage tank, Ultraviolet (UV) filtration system, and interconnection to existing irrigation control valve box.

Each condensate drainage point exits the building in ground. To collect the condensate outside the building, an in ground collection tank with submersible sump pump must be installed and the condensate then pumped to the main storage tank. The overflow from each collection tank will overflow to the existing sewer; as such the storage volume for each tank must be below the existing sewer drainage invert level.

Each main storage tank (there is one for each system) will collect all reclaimed condensate from each building condensate drainage point identified in each area. Collected condensate will be mechanically filtered and treated through an UV Sterilization system package. This system includes storage tank level probes, automatic filters, and UV sterilizers controlled through the system controller.

After UV sterilization, the recycled condensate must be pumped to each irrigation control valve box for each zone, where the recycled condensate is to be connected to the existing irrigation system and the irrigation controls reconfigured.

3.2 Basis of System Design

The tank sizes shown are based on collection of 100% of the maximum condensate drainage from the site for use in irrigation systems. The campus irrigation demand was calculated based on client data to average approximately 1,000 m³/day. This figure equates to approximately 365,000 m³ per annum.

In summary, the condensate recovery has been calculated to produce approximately 43,000 – 103,000 m³ per annum, which represents 11%-28% of the total irrigation requirements of the Campus Horseshoe area. The tables below summarises both the annual condensate recovered and also the peak condensate recovered, along with the irrigation demand for each area and the reduction in irrigation generation by the condensate available.

Within the West quadrant where a pilot is being considered, the recovery rate from adjacent buildings is expected to be between 48-114% of irrigation demand, depending on the outdoor air rate used by the air handling systems.

Table 1: Annual and Peak Condensate Recovery

	Annual Condensate Recovered based on Min Outside Air (Worst case) (m ³ per annum)	Annual Condensate Recovered based on Max Outside Air (Best case) (m ³ per annum)	Peak Condensate Recovery Rate (L/s)
Building 2	10,747	25,792	0.9
Building 3	10,747	25,792	0.9
Building 4	10,747	25,792	0.9
Building 5	10,747	25,792	0.9
Total (4 x Buildings)	10,747	25,792	NA
% of Annual Irrigation Requirement	11%	28%	NA

Table 2: Irrigation Demand

	Average Irrigation Demand (m ³ per annum)	Average Condensate Available (m ³ per annum)	Average Irrigation Generation Reduction (m ³ per annum)
North Area (CCU-2 & 3)	211,777	10,747 to 25,792	5% to 12%
East Area (CCU-1)	40,747	10,747 to 25,792	26% to 63%
West Area (CCU-4)	22,567	10,747 to 25,792	48% to 114%
South Area (CCU-5)	90,820	10,747 to 25,792	12% to 28%

3.3 Budget Estimate

The rough order of magnitude budget estimate for the proposed design can be found in Appendix 3.

Please note that all costs are in United States dollars (\$USD) and are based on Australian labour rates.

It is recommended that the indicative costs provided are verified based on cost analysis of the scope by KAUST contractors.

3.4 Assumptions

3.4.1 Calculation Assumptions

The following assumptions have been made in relation to the calculations used to estimate the amount of condensate generated;

- As derived from the AHU design schedules;
 - the outside air to all AHU's within Buildings 2, 3, 4 and 5 is first pre-conditioned via a total energy recovery wheel, which includes removal of moisture within the outside air stream. As a result of this, it is assumed that the majority of the moisture is removed from the outside air stream prior to being delivered to the cooling coils.
 - the maximum condition that the outside air is delivered to the AHU cooling coil(s) is 26.1 °C DB / 19.0 °C WB.
 - the air on cooling coil condition to all the AHU's is 26.7 °C DB / 19.4 °C WB.
- Air off the AHU cooling coil(s) has been based on the following condition.
 - the scheduled design air off cooling coil condition (11 °C DB / 96.5%RH = 0.0078 kg/kg) and has been applied to all operating times (24hrs/day, 7days/week).
- The hourly monthly average amount of condensate removed from the AHU cooling coil(s) have been based on a minimum and maximum outside air quantity as defined in the AHU design schedules.
- The peak amount of condensate removed from the AHU cooling coil(s) has been calculated based on the scheduled design maximum outside air quantity combined with the scheduled design air on cooling coil condition (26.7 °C DB / 19.4 °C WB 0.011 kg/kg).
- Note that information received from KAUST University Support Services on 08 August 2016 indicates that a typical AHU (2400-AHU-5.016) is operating at a supply airflow of 7581.9 L/s with an air on cooling condition of 25.8 °C/75.7%RH (approximately 0.016 kg/kg). As it would not be appropriate to apply the 'snapshot' to all systems, this condition has not been taken into account in calculations. However, it is noted that this condition suggests that the AHU Total Energy Wheel is not providing the leaving air conditions as per the technical schedules, with a potential impact on the energy efficiency of the systems.

3.4.2 Design Assumptions

The following assumptions have been made in relation to the proposed design;

- All proposed works including connection to existing condensate drains and installation of new condensate recycling system will occur outside of the buildings and no works have been allowed for within the existing buildings. It is understood that all building condensate drainage is collected at a specified number of points outside of the building where the new system will extend from.
- The proposed condensate drainage has not been coordinated with existing in ground services and no allowance has been made for re-instatement of landscaping or special installation methods.
- The connection to existing irrigation systems will require recycled condensate to be piped up to the existing irrigation control valve box for each irrigation zone, where new control valves will be installed and wired to interface with the existing system.

Separate works must be carried out for wiring and reconfiguration of the existing irrigation controls.

- Venting and overflow for proposed in ground collection tanks will need to be coordinated as part of further design development.

3.5 Operational Issues/considerations

While condensate wastewater is generally good quality, periodic sampling of condensate wastewater streams for contamination is recommended to maintain the health of the air handling systems.

In any application where reclaimed water could come into contact with human skin or ingested it requires treatment and sterilization; this also includes above ground irrigation. The international plumbing code does not specifically cover condensate water systems however the code references the International Green Construction Code (2012). Chapter 7 of this Code requires on-site reclaimed water to be sufficiently disinfected prior to any potential contact with people to mitigate risk to human health. UV and filtration systems are effective for sterilization of reclaimed water for above ground irrigation purposes. UV is considered to be the best non-chemical method of sterilisation. Chemicals such as chlorine are generally not recommended for purification of irrigation systems as these can kill grass and plants.

Each mechanical system requires maintenance for continuous operation. Items that will require ongoing maintenance include:

- In ground collection sump pumps
- Main collection tanks and level probes
- UV sterilization and filtration systems

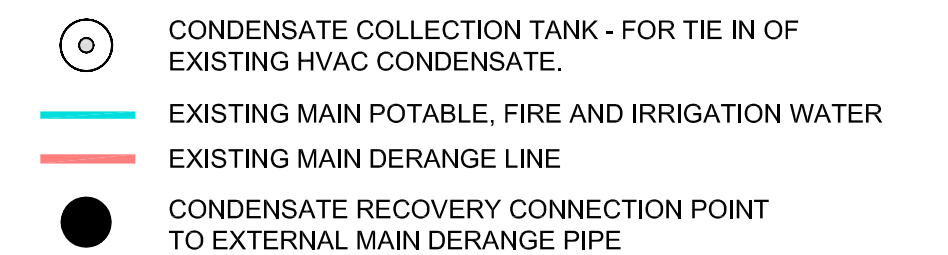
3.6 Summary

Based on the available information, a basic concept design has been produced for condensate recovery systems for selected campus buildings. It appears that by making an investment in a condensate recovery system of the order of \$210,000 USD, a 50-100% reduction in potable water use can be achieved within the West Quadrant irrigation systems of the campus.

It is noted that should KAUST wish to progress with this pilot scheme, further design development will be required to verify the design, identify related works, and ensure it is coordinated with the campus constraints.

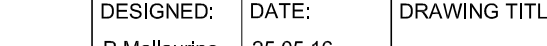
Appendix 1

Concept Layouts



1. REFER TO DRG. P15KAU01-000-LAY-M-002.
2. ALL EQUIPMENT LOCATIONS AND RETICULATION ROUTES ARE INDICATIVE AND SUBJECT TO SITE REVIEW AND APPROVAL BY KAUST UNIVERSITY SUPPORT SERVICES.
3. NOT TO BE USED FOR TENDER.
4. NOT TO BE USED FOR CONSTRUCTION.



										
	C0	UPDATED BASED ON CLIENT REVIEW COMMENTS	12.08.16	PM	HH	MIS	JOB	FJ		
CLIENT PROJECT No.	B0	PRELIMINARY ISSUE	27.05.16	PM	HH	MIS	JB	FJ		
CONSULTANT DRAWING No.										
REF. DRAWING No.	REFERENCE DRAWINGS	REV.	DESCRIPTION	DATE	DESIGNED	DRAWN	ENG_CHK	DWG_CHK	APP'D	CLIENT



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STATUS:	SHEET SIZE	DRAWING No.	REVISION
PRELIMINARY	A1	P15KAU01-000-LAY-M-001	C0



LEGEND		
SERVICE	PROPOSED	ABBREVIATION
IRRIGATION PIPE		IRR
DERANGE LINE		SAN
CONDENSATE DRAIN NETWORK		CWW
STORAGE TANK AND DISCHARGE PUMP		
CONDENSATE COLLECTION TANK AND DISCHARGE PUMP		
IRRIGATION CONTROL VALVE BOX		CCU

NOTES:

1. NO WORKS HAVE BEEN ALLOWED FOR WITHIN BUILDINGS. ALL PROPOSED WORKS SHOWN ARE EXTERNAL TO THE BUILDINGS.
2. NOT TO BE USED FOR TENDER.
3. NOT TO BE USED FOR CONSTRUCTION.
4. ALL EQUIPMENT LOCATIONS AND RETICULATION ROUTES ARE INDICATIVE AND SUBJECT TO SITE REVIEW AND APPROVAL BY KAUST UNIVERSITY SUPPORT SERVICES.



													 amec foster wheeler	© This drawing remains the property of the Amec Foster Wheeler Australia Pty Ltd and may not be copied in any way without its prior written approval.	DESIGNED: P Mallaurino	DATE: 25.05.16	DRAWING TITLE: KAUST - SAUDI ARABIA CONDENSATE RECOVERY SYSTEM LOCALITY PLAN AND PIPING LAYOUTS	
															DRAWN: H Heldsinger	DATE: 25.05.16		
															CHECKED: J Brink	DATE: 25.05.16		
															APPROVED: F Jeunet	DATE: 25.05.16		
															SCALE: AS STATED			
CLIENT PROJECT No.			C0	UPDATED BASED ON CLIENT REVIEW COMMENTS	12.08.16	PM	HH	MIS	JOB	FJ					STATUS: PRELIMINARY	SHEET SIZE: A1	DRAWING No. P15KAU01-000-LAY-M-002	REVISION: C0
CONSULTANT DRAWING No.	REF. DRAWING No.	REFERENCE DRAWINGS	REV.	DESCRIPTION	DATE	DESIGNED	DRAWN	ENG_CHK	DWG_CHK	APP'D	CLIENT							

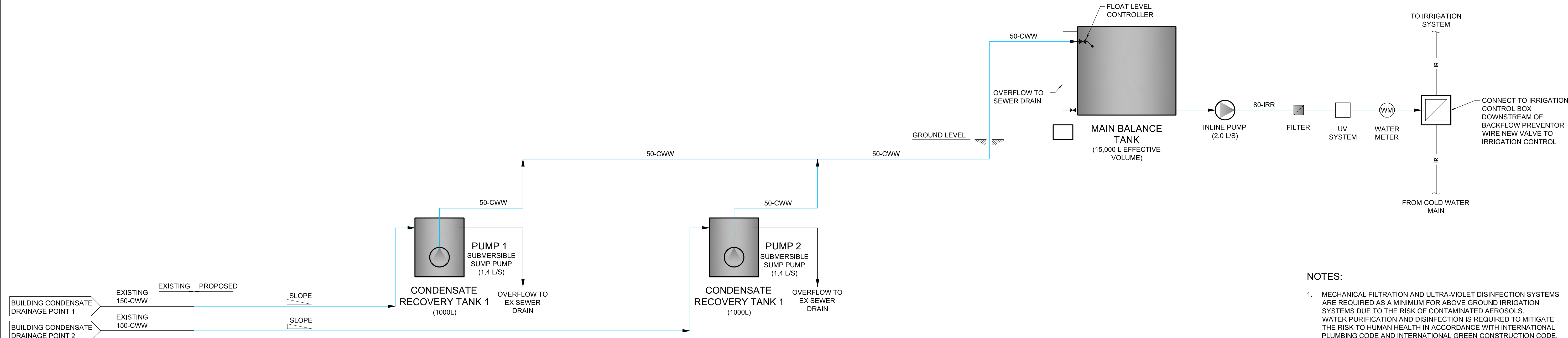


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DESIGNED: P Mallaurino	DATE: 25.05.16	DRAWING TITLE: KAUST - SAUDI ARABIA CONDENSATE RECOVERY SYSTEM LOCALITY PLAN AND PIPING LAYOUTS	
DRAWN: H Haldsinger	DATE: 25.05.16		
CHECKED: J Brink	DATE: 25.05.16		
APPROVED: F Jeunet	DATE: 25.05.16		
SCALE:			
AS STATED			
STATUS: PRELIMINARY	SHEET SIZE A1	DRAWING No. P15KAU01-000-LAY-M-002	REVISION C0

Appendix 2

Concept Schematics



EAST CONDENSATE RE-USE SYSTEM

- | | | | | |
|--------------|----------|--|------------------------|----------|
| DESIGNED: | DATE: | <div style="text-align: center;"> <h1>KAUST - SAUDI ARABIA</h1> <h2>CONDENSATE RECOVERY SYSTEM</h2> <h3>FLOW DIAGRAM</h3> </div> | | |
| P Mallaurino | 25.05.16 | | | |
| DRAWN: | DATE: | | | |
| H Heldsinger | 25.05.16 | | | |
| CHECKED: | DATE: | | | |
| J Brink | 25.05.16 | | | |
| APPROVED: | DATE: | | | |
| M Starkey | 25.05.16 | | | |
| SCALE: | | | | |
| STATUS: | | SHEET | DRAWING No. | REVISION |
| PRELIMINARY | | SIZE A1 | P15KAU01-000-SCE-M-001 | C0 |

												
	P15KAU01-000-LAY-M-002		C0	UPDATED BASED ON CLIENT REVIEW COMMENTS	12.08.16	PM	HH	MIS	JOB	FJ		
CLIENT PROJECT No.	P15KAU01-000-LAY-M-001		B0	PRELIMINARY ISSUE	27.05.16	PM	HH	MIS	JB	FJ		
CONSULTANT DRAWING No.	REF. DRAWING No.	REFERENCE DRAWINGS	REV.	DESCRIPTION	DATE	DESIGNED	DRAWN	ENG_CHK	DWG_CHK	APP'D	CLIENT	



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Appendix 4

Buildings 2, 3, 4 and 5 Monthly Hourly Average Condensation Removal Results

Calculation Cover Sheet



CLIENT:	KAUST	PROJECT NO:	P15KAU01	REVISION:	A3
PROJECT TITLE:	Condensate Recovery	DOCUMENT NO:	P15KAU01-000-CAL-M-001	DATE:	10/08/2016
		CLIENT DOCUMENT NO:		STATUS:	Information
PREPARED:		CHECKED:		APPROVED:	
Name	Paul Mallaurino	Name	Michael Starkey	Name	Frederic Jeunet

CALCULATION OBJECTIVE

1. To calculate the minimum and maximum Annual Condensate removed (m3) from AHU's within Buildings 2, 3, 4 and 5 - normalized for Daytime, Night-time and Monthly Temp and Humidity Variations.
2. To calculate the peak condensate removed (L/s) from each AHU within Buildings 2, 3, 4 and 5.

CALCULATION METHOD

1. Calculate the ambient monthly hourly average moisture content (kg/kg/) from weather data obtained for the region. (Refer to 'Month' Tabs). Determine from this whether the air on moisture content is above or below 0.011 kg/kg , as 0.011 kg/kg is the maximum amount of air on moisture content a typical AHU cooling coil is sized for.
2. Calculate the amount of moisture (kg/kg) removed for each monthly hourly average, based on estimated cooling coil air off conditions for that hour of operation. (Refer to 'Month' Tabs)
3. Establish the calculated average moisture removal for each month (kg/kg). (Refer to 'Month' Tabs)
4. Using the calculated average moisture removal for each month (kg/kg), calculate the amount of condensate removed (m3) from each AHU per month within each building, based on the minimum and maximum outside airflow for that AHU. Expand the calculation to show the amount of moisture removed for all AHU's per month within each building. (Refer to 'BLDG' Tabs)
5. From the results, calculate the Annual Min/Max Total amount of condensate removed (m3) for 1 x AHU and Annual Min/Max Total amount of condensate removed (m3) for each LAB Building (x 20 AHU's). (Refer to 'BLDG' Tabs)
6. Calculate the instantaneous maximum amount of condensate removed (L/s) from each AHU within each building based on the maximum outside airflow for each AHU. (Refer to 'BLDG' Tabs)

ASSUMPTIONS/NOTES

1. AHU cooling coil air off conditions have been shown as 'Condition 1'. (Refer to 'Month' Tabs). No set-back of temperature or airflow has been implemented for after hours.
2. Weather data for October 2015 only consists of 3 days worth of data (01/10/15 to 03/10/15).
3. Weather data for March 2016 only consists of 5 days worth of data (01/03/16 to 03/03/16).
4. Specific volume of air of 1.2 kg/m3 used in condensate L/day calculations. (Refer to 'BLDG' Tabs)
5. Peak ambient moisture content condition used for maximum condensate flow established from AHU coil schedules provided, which indicates the conditions the cooling coils are based on.
6. The annual calculations are based on weather data over a 12 month period from March 2015 to March 2016.

REFERENCES

1. Weather data file 'ST TEMP RH.XLSX' received on Thursday, 28 April 2016 7:45 PM, containing weather data from March 2015 to March 2016
2. AHU schedules 'BLDG02_UN2300', 'BLDG03_UN2400', 'BLDG04_UN2600', 'BLDG05_UN2700'.
3. Client review comments received on 29 July 2016.

CONCLUSIONS

1. Building 2: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9L/s.
2. Building 3: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9 L/s.
3. Building 4: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9 L/s.
4. Building 5: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9 L/s.

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Satuation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

March 2015 Hourly Averages															
										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moiture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)		Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
							Choose Air Off Condition								
12-1 am	24.9	67.5	3129	2112	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	24.6	68.7	3074	2112	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	24.2	69.8	3001	2095	0.0130	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	24	70	2966	2076	0.0129	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	23.8	69.7	2930	2042	0.0127	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	23.5	68.9	2878	1983	0.0123	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	23.6	68.5	2895	1983	0.0123	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	23.7	67.4	2913	1963	0.0122	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	25.2	62.8	3185	2000	0.0124	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	27.1	56.6	3562	2016	0.0125	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	27.4	55.8	3625	2023	0.0125	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	27.3	57.2	3604	2061	0.0128	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	27.3	58.5	3604	2108	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	27	60.4	3541	2139	0.0133	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	27	61.2	3541	2167	0.0134	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	26.7	62.4	3480	2171	0.0135	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	26.4	63.8	3419	2181	0.0135	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	26.2	65.1	3379	2200	0.0136	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	25.7	66.7	3281	2188	0.0136	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	25.5	67.5	3242	2189	0.0136	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	25.4	68.6	3223	2211	0.0137	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	25.2	69.2	3185	2204	0.0137	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	25.1	68.8	3166	2179	0.0135	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	25	68	3148	2140	0.0133	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	25.5	65.1	3249	2106		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Saturation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

April 2015 Hourly Averages

										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Saturation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moisture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moisture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	24.7	63.3	3092	1957	0.0121	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	24.9	63.1	3129	1974	0.0122	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	24.7	63.7	3092	1970	0.0122	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	24.4	64.1	3037	1947	0.0121	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	24.2	64	3001	1921	0.0119	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	24.1	63.6	2983	1897	0.0118	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	24.1	64.1	2983	1912	0.0119	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	24.6	63.5	3074	1952	0.0121	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	26.2	58	3379	1960	0.0122	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	27.2	54.4	3583	1949	0.0121	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	27.1	54.6	3562	1945	0.0121	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	26.5	56.3	3439	1936	0.0120	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	27	58.8	3541	2082	0.0129	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	26.9	59.2	3521	2084	0.0129	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	26.8	60.1	3500	2104	0.0130	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	26.6	61	3459	2110	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	26.4	61.9	3419	2116	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	26.1	63	3359	2116	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	25.6	64.4	3262	2100	0.0130	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	25.4	65.6	3223	2114	0.0131	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	25.4	64.3	3223	2073	0.0128	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	25.4	64.1	3223	2066	0.0128	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	25.4	63.5	3223	2047	0.0127	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	25.3	63.7	3204	2041	0.0127	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	25.6	61.8	3271	2016		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition		1
	T=	11.0
	RH=	96.5
Calculated Satuation Vapour Pressure (Ps)		1309
Calculated Water Vapour Pressure (Pa)		1263
Calculated Air Off Moisture Content (kg/kg)		0.0078

May 2015 Hourly Averages															
										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	27.9	60.3	3732	2250	0.0140	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	28.2	61.7	3798	2343	0.0145	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	28.1	62.7	3776	2367	0.0147	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	27.8	65	3710	2412	0.0150	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	27.5	66	3646	2407	0.0149	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	27.4	66.2	3625	2400	0.0149	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	27.4	64.7	3625	2345	0.0145	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	28.4	61.7	3842	2370	0.0147	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	30	58.2	4212	2451	0.0152	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	30.2	60.2	4261	2565	0.0159	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	30	62.2	4212	2620	0.0162	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	30.2	61.2	4261	2607	0.0162	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	30.3	60.6	4285	2597	0.0161	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	30.1	61.7	4236	2614	0.0162	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	30	62.4	4212	2628	0.0163	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	30	62.4	4212	2628	0.0163	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	29.6	63.4	4117	2610	0.0162	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	29.6	64.5	4117	2655	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	28.7	65.6	3909	2564	0.0159	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	28.5	66.6	3864	2573	0.0160	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	28.4	65.7	3842	2524	0.0156	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	28.3	65.6	3820	2506	0.0155	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	28.2	65.7	3798	2495	0.0155	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	28.2	64.1	3798	2434	0.0151	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	28.9	63.3	3954	2499		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition		1
	T=	11.0
	RH=	96.5
Calculated Satuation Vapour Pressure (Ps)		1309
Calculated Water Vapour Pressure (Pa)		1263
Calculated Air Off Moisture Content (kg/kg)		0.0078

June 2015 Hourly Averages															
										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	27.86	63.48	3723	2364	0.0147	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	28.18	64.58	3793	2450	0.0152	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	27.91	67	3734	2502	0.0155	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	27.69	66.46	3687	2450	0.0152	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	27.54	67.27	3655	2459	0.0152	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	27.4	68.8	3625	2494	0.0155	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	27.4	69	3625	2501	0.0155	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	28.2	66.1	3798	2510	0.0156	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	29.6	63.5	4117	2614	0.0162	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	30	62.9	4212	2649	0.0164	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	30.1	62.3	4236	2639	0.0164	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	30.3	61.5	4285	2635	0.0163	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	30.3	62.2	4285	2665	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	30.4	62.5	4309	2693	0.0167	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	30.5	61.6	4334	2670	0.0166	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	30.4	61.8	4309	2663	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	30.2	62.5	4261	2663	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	30	63.2	4212	2662	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	29.5	64.4	4093	2636	0.0163	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	29.1	66.1	4000	2644	0.0164	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	28.9	66.2	3954	2618	0.0162	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	28.8	65.5	3932	2575	0.0160	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	28.6	64.8	3886	2518	0.0156	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	28.6	63.7	3886	2476	0.0153	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	29.1	64.5	3998	2573		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Satuation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

July 2015 Hourly Averages

										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	29.4	57.9	4070	2356	0.0146	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	29.6	62.1	4117	2556	0.0159	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	29.3	66.1	4046	2675	0.0166	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	29	70	3977	2784	0.0173	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	28.3	73	3820	2788	0.0173	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	28	74.1	3754	2782	0.0172	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	27.6	74.8	3668	2743	0.0170	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	28.4	72.5	3842	2785	0.0173	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	30.6	66.4	4359	2894	0.0179	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	31.6	60.9	4613	2809	0.0174	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	32	58.9	4718	2779	0.0172	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	32.1	57.4	4745	2724	0.0169	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	32.2	56.7	4772	2706	0.0168	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	32.3	56.4	4799	2706	0.0168	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	32.4	55.1	4826	2659	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	32.5	54.2	4853	2630	0.0163	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	32.1	56	4745	2657	0.0165	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	31.7	58.5	4639	2714	0.0168	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	31.2	60.8	4510	2742	0.0170	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	30.7	62.1	4384	2722	0.0169	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	30.5	62	4334	2687	0.0167	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	30.4	60	4309	2586	0.0160	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	30.4	57.1	4309	2461	0.0153	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	30.3	55.4	4285	2374	0.0147	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	30.5	62.0	4354	2680		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Satuation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

August 2015 Hourly Averages

										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	32	63.3	4718	2987	0.0185	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	32.2	65.5	4772	3125	0.0194	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	32.1	67.6	4745	3208	0.0199	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	31.8	69.9	4665	3261	0.0202	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	31.7	71.6	4639	3322	0.0206	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	31.4	72.6	4561	3311	0.0205	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	31.3	72.9	4535	3306	0.0205	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	31.5	71.8	4587	3294	0.0204	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	32.3	68.3	4799	3277	0.0203	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	32.7	66.9	4908	3283	0.0204	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	32.9	66.5	4963	3300	0.0205	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	32.8	67	4935	3307	0.0205	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	32.8	66.7	4935	3292	0.0204	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	32.9	66.8	4963	3315	0.0206	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	32.8	66.9	4935	3302	0.0205	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	32.7	67.2	4908	3298	0.0204	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	32.6	67.5	4880	3294	0.0204	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	32.5	67.6	4853	3281	0.0203	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	32.4	66.6	4826	3214	0.0199	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	32.4	67.3	4826	3248	0.0201	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	32.4	67	4826	3233	0.0200	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	32.4	66	4826	3185	0.0197	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	32.4	64.9	4826	3132	0.0194	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	32.4	64.9	4826	3132	0.0194	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	32.3	67.6	4802	3246		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Satuation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

September 2015 Hourly Averages

										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	30.3	67.8	4285	2905	0.0180	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	30.7	69.2	4384	3033	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	30.6	69.4	4359	3025	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	30.5	69	4334	2990	0.0185	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	30.4	70.8	4309	3051	0.0189	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	30	71.4	4212	3007	0.0186	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	29.8	72.6	4164	3023	0.0187	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	30	72	4212	3033	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	31.6	67.4	4613	3109	0.0193	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	32.4	63.3	4826	3055	0.0189	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	32.4	64.1	4826	3093	0.0192	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	32.3	65.4	4799	3138	0.0195	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	32.2	66.1	4772	3154	0.0196	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	32.3	65.6	4799	3148	0.0195	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	32.2	66.2	4772	3159	0.0196	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	32	67.5	4718	3185	0.0197	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	31.8	68.7	4665	3205	0.0199	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	31.6	69	4613	3183	0.0197	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	31.2	69.7	4510	3143	0.0195	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	31.1	68.7	4484	3081	0.0191	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	31.2	67.7	4510	3053	0.0189	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	31.2	67.2	4510	3031	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	31	67.9	4459	3028	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	30.9	68.4	4434	3033	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	31.2	68.1	4524	3078		0.011		0.0078	0.0032						

= User Input

(Only 3 days recorded in this month)

Air Off Cooling Coil: Condition		1
	T=	11.0
	RH=	96.5
Calculated Satuation Vapour Pressure (Ps)		1309
Calculated Water Vapour Pressure (Pa)		1263
Calculated Air Off Moisture Content (kg/kg)		0.0078

October 2015 Hourly Averages															
										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)		Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	29.9	64.1	4188	2685	0.0166	0.011	1	0.0078	0.0032	4720	11327	65	155.14	1293	3103
1-2 am	30	64.8	4212	2729	0.0169	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	29.9	57	4188	2387	0.0148	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	30.2	54	4261	2301	0.0143	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	30.5	49.7	4334	2154	0.0134	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	30.1	43.4	4236	1839	0.0114	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	30	42	4212	1769	0.0110	0.011	1	0.0078	0.0031	4720	11327	64	154	1280	3072
7-8 am	30.8	40.6	4409	1790	0.0111	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	33.5	37.3	5132	1914	0.0119	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	35.7	33.9	5795	1965	0.0122	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	36.6	31.4	6087	1911	0.0119	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	37.4	30	6358	1907	0.0118	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	36.4	40	6021	2409	0.0149	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	34.9	51.2	5546	2840	0.0176	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	32.9	63.5	4963	3151	0.0195	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	32.6	63.6	4880	3104	0.0192	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	32.3	65.6	4799	3148	0.0195	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	31.6	68.3	4613	3151	0.0195	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	31.1	69.5	4484	3117	0.0193	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	30.8	70.8	4409	3121	0.0194	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	30.5	71.1	4334	3081	0.0191	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	30.3	70.6	4285	3025	0.0188	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	30.2	67.7	4261	2884	0.0179	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	30.9	58.1	4434	2576	0.0160	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	32.0	54.5	4768	2540		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Satuation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

November 2015 Hourly Averages

										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	25.3	62	3204	1987	0.0123	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
1-2 am	25.4	63.9	3223	2060	0.0128	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
2-3 am	25.1	64.8	3166	2052	0.0127	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
3-4 am	24.7	65.5	3092	2025	0.0126	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
4-5 am	24.5	64.3	3056	1965	0.0122	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
5-6 am	24.4	63.7	3037	1935	0.0120	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
6-7 am	24.3	63	3019	1902	0.0118	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
7-8 am	24.7	60.5	3092	1871	0.0116	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
8-9 am	26.1	56.2	3359	1888	0.0117	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
9-10 am	28	50.3	3754	1888	0.0117	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
10-11 am	28.8	48.9	3932	1923	0.0119	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
11-12 am	29	49.1	3977	1953	0.0121	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
12-1 pm	29	51.1	3977	2032	0.0126	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
1-2 pm	29.1	51.7	4000	2068	0.0128	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
2-3 pm	28.9	53.8	3954	2127	0.0132	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
3-4 pm	28.6	55.9	3886	2173	0.0135	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
4-5 pm	28.3	57.9	3820	2212	0.0137	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
5-6 pm	27.9	59.5	3732	2221	0.0138	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
6-7 pm	27.6	61.3	3668	2248	0.0139	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
7-8 pm	27.4	62.9	3625	2280	0.0141	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
8-9 pm	27.2	63.9	3583	2290	0.0142	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
9-10pm	26.8	64.7	3500	2265	0.0140	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
10-11 pm	26.5	64.2	3439	2208	0.0137	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
11-12 pm	26.2	63.2	3379	2136	0.0132	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
AVE.	26.8	59.3	3520	2071		0.011		0.0078	0.0032						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Satuation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

December 2015 Hourly Averages																
											Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Ambient Air On CC Moiture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)	
12-1 am	22	52.8	2629	1388	0.0086	0.011	1	0.0078	0.0008	4720	11327	16	38	316	759	
1-2 am	22	54.2	2629	1425	0.0088	0.011	1	0.0078	0.0010	4720	11327	20	49	409	982	
2-3 am	21.6	54.7	2566	1403	0.0087	0.011	1	0.0078	0.0009	4720	11327	18	43	355	852	
3-4 am	21.4	55	2535	1394	0.0086	0.011	1	0.0078	0.0008	4720	11327	17	40	331	795	
4-5 am	21.2	55.2	2504	1382	0.0086	0.011	1	0.0078	0.0007	4720	11327	15	36	301	723	
5-6 am	21	55.7	2473	1378	0.0085	0.011	1	0.0078	0.0007	4720	11327	14	35	290	696	
6-7 am	20.9	55.5	2458	1364	0.0085	0.011	1	0.0078	0.0006	4720	11327	13	31	256	615	
7-8 am	20.9	54.8	2458	1347	0.0084	0.011	1	0.0078	0.0005	4720	11327	11	26	213	511	
8-9 am	22	51.7	2629	1359	0.0084	0.011	1	0.0078	0.0006	4720	11327	12	29	243	583	
9-10 am	23.9	46.6	2948	1374	0.0085	0.011	1	0.0078	0.0007	4720	11327	14	34	280	672	
10-11 am	25.2	44	3185	1402	0.0087	0.011	1	0.0078	0.0009	4720	11327	18	42	350	841	
11-12 am	25.6	43.7	3262	1425	0.0088	0.011	1	0.0078	0.0010	4720	11327	21	49	410	985	
12-1 pm	25.8	44	3300	1452	0.0090	0.011	1	0.0078	0.0012	4720	11327	24	57	478	1148	
1-2 pm	25.6	45.8	3262	1494	0.0093	0.011	1	0.0078	0.0014	4720	11327	29	70	584	1401	
2-3 pm	25.5	46.7	3242	1514	0.0094	0.011	1	0.0078	0.0016	4720	11327	32	76	635	1524	
3-4 pm	25.3	48.2	3204	1544	0.0096	0.011	1	0.0078	0.0017	4720	11327	36	85	712	1708	
4-5 pm	24.9	49.7	3129	1555	0.0096	0.011	1	0.0078	0.0018	4720	11327	37	89	739	1773	
5-6 pm	24.6	51	3074	1568	0.0097	0.011	1	0.0078	0.0019	4720	11327	39	92	770	1848	
6-7 pm	24.2	52	3001	1561	0.0097	0.011	1	0.0078	0.0018	4720	11327	38	90	753	1806	
7-8 pm	24.1	52.4	2983	1563	0.0097	0.011	1	0.0078	0.0019	4720	11327	38	91	759	1822	
8-9 pm	23.9	52.8	2948	1557	0.0097	0.011	1	0.0078	0.0018	4720	11327	37	89	742	1781	
9-10pm	23.5	53	2878	1525	0.0095	0.011	1	0.0078	0.0016	4720	11327	33	80	663	1592	
10-11 pm	23	53.5	2793	1494	0.0093	0.011	1	0.0078	0.0014	4720	11327	29	70	584	1403	
11-12 pm	22.5	53	2710	1436	0.0089	0.011	1	0.0078	0.0011	4720	11327	22	53	438	1051	
AVE.	23.4	51.1	2867	1454		0.011		0.0078	0.0012							

= User Input

Air Off Cooling Coil: Condition		1
	T=	11.0
	RH=	96.5
Calculated Satuation Vapour Pressure (Ps)		1309
Calculated Water Vapour Pressure (Pa)		1263
Calculated Air Off Moisture Content (kg/kg)		0.0078

January 2016 Hourly Averages															
										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	21.1	59.1	2489	1471	0.0091	0.011	1	0.0078	0.0013	4720	11327	26	63	525	1260
1-2 am	21	59.9	2473	1482	0.0092	0.011	1	0.0078	0.0014	4720	11327	28	66	553	1326
2-3 am	20.7	60.1	2428	1459	0.0090	0.011	1	0.0078	0.0012	4720	11327	25	60	497	1192
3-4 am	20.4	59.6	2384	1421	0.0088	0.011	1	0.0078	0.0010	4720	11327	20	48	399	958
4-5 am	20.1	58.9	2340	1378	0.0085	0.011	1	0.0078	0.0007	4720	11327	15	35	292	701
5-6 am	19.9	58.6	2312	1355	0.0084	0.011	1	0.0078	0.0006	4720	11327	12	28	232	556
6-7 am	19.8	58.6	2297	1346	0.0083	0.011	1	0.0078	0.0005	4720	11327	11	25	211	505
7-8 am	19.8	57.9	2297	1330	0.0082	0.011	1	0.0078	0.0004	4720	11327	8	20	170	408
8-9 am	20.7	54.6	2428	1326	0.0082	0.011	1	0.0078	0.0004	4720	11327	8	19	159	381
9-10 am	22.7	49.3	2743	1352	0.0084	0.011	1	0.0078	0.0006	4720	11327	11	27	225	541
10-11 am	24	47.5	2966	1409	0.0087	0.011	1	0.0078	0.0009	4720	11327	18	44	368	884
11-12 am	24.2	48.5	3001	1456	0.0090	0.011	1	0.0078	0.0012	4720	11327	24	58	487	1169
12-1 pm	24.3	48.9	3019	1476	0.0092	0.011	1	0.0078	0.0013	4720	11327	27	65	540	1295
1-2 pm	24.3	49.7	3019	1501	0.0093	0.011	1	0.0078	0.0015	4720	11327	30	72	601	1442
2-3 pm	24.3	51.3	3019	1549	0.0096	0.011	1	0.0078	0.0018	4720	11327	36	87	723	1735
3-4 pm	24.1	52.9	2983	1578	0.0098	0.011	1	0.0078	0.0020	4720	11327	40	96	797	1913
4-5 pm	23.8	54.1	2930	1585	0.0098	0.011	1	0.0078	0.0020	4720	11327	41	98	815	1956
5-6 pm	23.4	56.7	2861	1622	0.0101	0.011	1	0.0078	0.0022	4720	11327	45	109	908	2179
6-7 pm	23	58.4	2793	1631	0.0101	0.011	1	0.0078	0.0023	4720	11327	47	112	931	2233
7-8 pm	23	59.1	2793	1651	0.0102	0.011	1	0.0078	0.0024	4720	11327	49	118	980	2352
8-9 pm	22.9	59.4	2776	1649	0.0102	0.011	1	0.0078	0.0024	4720	11327	49	117	976	2342
9-10pm	22.7	59.6	2743	1635	0.0101	0.011	1	0.0078	0.0023	4720	11327	47	113	940	2255
10-11 pm	22.3	59.7	2677	1598	0.0099	0.011	1	0.0078	0.0021	4720	11327	42	102	848	2034
11-12 pm	21.8	59.8	2597	1553	0.0096	0.011	1	0.0078	0.0018	4720	11327	37	88	733	1760
AVE.	22.3	55.9	2682	1492		0.011		0.0078	0.0014						

= User Input

Air Off Cooling Coil: Condition	1
T=	11.0
RH=	96.5
Calculated Saturation Vapour Pressure (Ps)	1309
Calculated Water Vapour Pressure (Pa)	1263
Calculated Air Off Moisture Content (kg/kg)	0.0078

February 2016 Hourly Averages

										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Saturation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	22	58.1	2629	1527	0.0095	0.011	1	0.0078	0.0016	4720	11327	33	80	668	1604
1-2 am	22.1	57.7	2645	1526	0.0095	0.011	1	0.0078	0.0016	4720	11327	33	80	665	1596
2-3 am	21.7	57	2581	1471	0.0091	0.011	1	0.0078	0.0013	4720	11327	26	63	527	1264
3-4 am	21.4	56.5	2535	1432	0.0089	0.011	1	0.0078	0.0010	4720	11327	21	51	427	1026
4-5 am	21.3	55.6	2519	1401	0.0087	0.011	1	0.0078	0.0009	4720	11327	17	42	348	835
5-6 am	21.2	54	2504	1352	0.0084	0.011	1	0.0078	0.0006	4720	11327	11	27	225	540
6-7 am	21.2	52.1	2504	1304	0.0081	0.011	1	0.0078	0.0003	4720	11327	5	13	105	252
7-8 am	21.2	49.8	2504	1247	0.0077	0.011	1	0.0078	0.0000	4720	11327	0	0	0	0
8-9 am	22.6	46.2	2726	1260	0.0078	0.011	1	0.0078	0.0000	4720	11327	0	0	0	0
9-10 am	24.8	42.5	3111	1322	0.0082	0.011	1	0.0078	0.0004	4720	11327	7	18	149	358
10-11 am	25.9	42.2	3320	1401	0.0087	0.011	1	0.0078	0.0009	4720	11327	17	42	349	837
11-12 am	26.6	43.3	3459	1498	0.0093	0.011	1	0.0078	0.0015	4720	11327	30	71	594	1425
12-1 pm	26.4	44.6	3419	1525	0.0095	0.011	1	0.0078	0.0016	4720	11327	33	79	662	1589
1-2 pm	26.5	45.5	3439	1565	0.0097	0.011	1	0.0078	0.0019	4720	11327	38	92	763	1831
2-3 pm	26.5	47.5	3439	1634	0.0101	0.011	1	0.0078	0.0023	4720	11327	47	112	937	2249
3-4 pm	26	52.1	3340	1740	0.0108	0.011	1	0.0078	0.0030	4720	11327	60	145	1206	2894
4-5 pm	25.5	54.7	3242	1774	0.0110	0.011	1	0.0078	0.0032	4720	11327	65	155	1291	3098
5-6 pm	25	57.3	3148	1804	0.0112	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
6-7 pm	24.3	60.3	3019	1821	0.0113	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
7-8 pm	23.9	62	2948	1828	0.0113	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
8-9 pm	23.8	62.5	2930	1831	0.0114	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3102
9-10pm	23.5	61.4	2878	1767	0.0110	0.011	1	0.0078	0.0031	4720	11327	64	153	1275	3059
10-11 pm	23.2	61.4	2827	1736	0.0108	0.011	1	0.0078	0.0029	4720	11327	60	143	1195	2867
11-12 pm	22.8	60.5	2759	1669	0.0104	0.011	1	0.0078	0.0025	4720	11327	51	123	1028	2466
AVE.	23.7	53.5	2934	1560		0.011		0.0078	0.0018						

= User Input

Air Off Cooling Coil: Condition		1
T=		11.0
RH=		96.5
Calculated Satuation Vapour Pressure (Ps)		1309
Calculated Water Vapour Pressure (Pa)		1263
Calculated Air Off Moisture Content (kg/kg)		0.0078

(Only 5 days recorded in this month)

March 2016 Hourly Averages															
										Outdoor Air (1 x AHU)		Average Coil Condensate (1 x AHU)		Average Coil Condensate per Building (20 x AHU)	
	Ave O/A Temp	Ave O/A RH (%)	Calculated Satuation Vapour Pressure (Ps)	Calculated Water Vapour Pressure (Pa)	Calculated Ambient Air On CC Moisture Content (kg/kg)	Design Air On CC Moiture Content (kg/kg)	Choose Air Off Condition	Air Off CC Moiture Content (kg/kg)	Δ kg/kg	Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L)	Maximum (L)	Minimum (L)	Maximum (L)
12-1 am	24.6	74.9	3074	2302	0.0143	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 am	24.7	75.6	3092	2338	0.0145	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 am	24.6	76.1	3074	2339	0.0145	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 am	23.9	77	2948	2270	0.0141	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 am	23.6	77	2895	2229	0.0138	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 am	23.4	76.2	2861	2180	0.0135	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 am	23.6	73.5	2895	2128	0.0132	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 am	24.2	67.8	3001	2035	0.0126	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 am	25.6	61.8	3262	2016	0.0125	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10 am	27.7	50.5	3689	1863	0.0116	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 am	29	46.6	3977	1853	0.0115	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 am	29.5	48.9	4093	2002	0.0124	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
12-1 pm	29	55.5	3977	2207	0.0137	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
1-2 pm	28.5	58.6	3864	2264	0.0140	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
2-3 pm	28	61.2	3754	2297	0.0142	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
3-4 pm	27.5	62.6	3646	2283	0.0142	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
4-5 pm	27	66.1	3541	2341	0.0145	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
5-6 pm	26.6	68.6	3459	2373	0.0147	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
6-7 pm	25.8	72.6	3300	2396	0.0149	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
7-8 pm	25.6	73.3	3262	2391	0.0148	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
8-9 pm	25.4	74.4	3223	2398	0.0149	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
9-10pm	25.3	74.4	3204	2384	0.0148	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
10-11 pm	25.1	73.9	3166	2340	0.0145	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
11-12 pm	24.9	74.2	3129	2322	0.0144	0.011	1	0.0078	0.0032	4720	11327	65	155	1293	3103
AVE.	26.0	67.6	3350	2231		0.011		0.0078	0.0032						

Appendix 5

Buildings 2, 3, 4 and 5 Annual & Peak Condensation Removal Results

Calculation Cover Sheet



CLIENT:	KAUST	PROJECT NO:	P15KAU01	REVISION:	A3
PROJECT TITLE:	Condensate Recovery	DOCUMENT NO:	P15KAU01-000-CAL-M-001	DATE:	10/08/2016
		CLIENT DOCUMENT NO:		STATUS:	Information
PREPARED:		CHECKED:		APPROVED:	
Name	Paul Mallaurino	Name	Michael Starkey	Name	Frederic Jeunet

CALCULATION OBJECTIVE

1. To calculate the minimum and maximum Annual Condensate removed (m3) from AHU's within Buildings 2, 3, 4 and 5 - normalized for Daytime, Night-time and Monthly Temp and Humidity Variations.
2. To calculate the peak condensate removed (L/s) from each AHU within Buildings 2, 3, 4 and 5.

CALCULATION METHOD

1. Calculate the ambient monthly hourly average moisture content (kg/kg/) from weather data obtained for the region. (Refer to 'Month' Tabs). Determine from this whether the air on moisture content is above or below 0.011 kg/kg , as 0.011 kg/kg is the maximum amount of air on moisture content a typical AHU cooling coil is sized for.
2. Calculate the amount of moisture (kg/kg) removed for each monthly hourly average, based on estimated cooling coil air off conditions for that hour of operation. (Refer to 'Month' Tabs)
3. Establish the calculated average moisture removal for each month (kg/kg). (Refer to 'Month' Tabs)
4. Using the calculated average moisture removal for each month (kg/kg), calculate the amount of condensate removed (m3) from each AHU per month within each building, based on the minimum and maximum outside airflow for that AHU. Expand the calculation to show the amount of moisture removed for all AHU's per month within each building. (Refer to 'BLDG' Tabs)
5. From the results, calculate the Annual Min/Max Total amount of condensate removed (m3) for 1 x AHU and Annual Min/Max Total amount of condensate removed (m3) for each LAB Building (x 20 AHU's). (Refer to 'BLDG' Tabs)
6. Calculate the instantaneous maximum amount of condensate removed (L/s) from each AHU within each building based on the maximum outside airflow for each AHU. (Refer to 'BLDG' Tabs)

ASSUMPTIONS/NOTES

1. AHU cooling coil air off conditions have been shown as 'Condition 1'. (Refer to 'Month' Tabs). No set-back of temperature or airflow has been implemented for after hours.
2. Weather data for October 2015 only consists of 3 days worth of data (01/10/15 to 03/10/15).
3. Weather data for March 2016 only consists of 5 days worth of data (01/03/16 to 03/03/16).
4. Specific volume of air of 1.2 kg/m3 used in condensate L/day calculations. (Refer to 'BLDG' Tabs)
5. Peak ambient moisture content condition used for maximum condensate flow established from AHU coil schedules provided, which indicates the conditions the cooling coils are based on.
6. The annual calculations are based on weather data over a 12 month period from March 2015 to March 2016.

REFERENCES

1. Weather data file 'ST TEMP RH.XLSX' received on Thursday, 28 April 2016 7:45 PM, containing weather data from March 2015 to March 2016
2. AHU schedules 'BLDG02_UN2300', 'BLDG03_UN2400', 'BLDG04_UN2600', 'BLDG05_UN2700'.
3. Client review comments received on 29 July 2016.

CONCLUSIONS

1. Building 2: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9L/s.
2. Building 3: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9 L/s.
3. Building 4: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9 L/s.
4. Building 5: Calculated Minimum annual condensate recovery = 10,747m3, Maximum annual condensate recovery = 25,792m3, Peak Condensate Recovery = 0.9 L/s.

Annual Condensate for Typical Building 2 AHU - normalized for Daytime, Night-time and Monthly Temp and Humidity Variations

Month	Average Moisture Content Removed (kg/kg)	Outdoor Air (1 x AHU)		Coil Condensate (1 x AHU)		Days per Month	Coil Condensate Monthly Total (1 x AHU)		Coil Condensate Monthly Building Total (20 x AHU's)	
		Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L/Day)	Maximum (L/Day)		Minimum Total (m3)	Maximum Total (m3)	Minimum Total (m3)	Maximum Total (m3)
Mar-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Apr-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
May-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Jun-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Jul-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Aug-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Sep-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Oct-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Nov-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Dec-15	0.001	4720	11327	581	1393	31	18	43	360	864
Jan-16	0.001	4720	11327	695	1669	31	22	52	431	1035
Feb-16	0.002	4720	11327	879	2110	28	25	59	492	1182
Mar-16	0.003	4720	11327	1552	3723	31	48	115	962	2309

Annual Min/Max Total for 1 x AHU (m3)	537	1290
Annual Min/Max Total for LAB Building 2 (x 20 AHU's) (m3)	10747	25792

Peak Condensate for Building 2 AHU's

AHU	Max. O/A Quantity (L/s)	Peak Air On Moisture Content (kg/kg)	Max. Air Off CC Moisture Content (kg/kg)	Max. Moisture Content Removed (kg/kg)	Max. Coil Condensate (L/s)
UN2300-AHU-0.01	4531	0.011	0.0078	0.0032	0.02
UN2300-AHU-0.02	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.01	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.02	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.03	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.04	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.05	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.06	11327	0.011	0.0078	0.0032	
UN2300-AHU-5.07	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.08	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.09	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.10	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.11	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.12	11327	0.011	0.0078	0.0032	
UN2300-AHU-5.13	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.14	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.15	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.16	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.17	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.18	11327	0.011	0.0078	0.0032	
UN2300-AHU-5.19	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.20	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.21	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.22	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.23	11327	0.011	0.0078	0.0032	0.04
UN2300-AHU-5.24	11327	0.011	0.0078	0.0032	

MAX. TOTAL (L/s) 0.9

= Stand-by Unit

Annual Condensate for Typical Building 3 AHU - normalized for Daytime, Night-time and Monthly Temp and Humidity Variations

Month	Average Moisture Content Removed (kg/kg)	Outdoor Air (1 x AHU)		Coil Condensate (1 x AHU)		Days per Month	Coil Condensate Monthly Total (1 x AHU)		Coil Condensate Monthly Building Total (20 x AHU's)	
		Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L/Day)	Maximum (L/Day)		Minimum Total (m3)	Maximum Total (m3)	Minimum Total (m3)	Maximum Total (m3)
Mar-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Apr-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
May-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Jun-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Jul-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Aug-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Sep-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Oct-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Nov-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Dec-15	0.001	4720	11327	581	1393	31	18	43	360	864
Jan-16	0.001	4720	11327	695	1669	31	22	52	431	1035
Feb-16	0.002	4720	11327	879	2110	28	25	59	492	1182
Mar-16	0.003	4720	11327	1552	3723	31	48	115	962	2309

Annual Min/Max Total for 1 x AHU (m3)	537	1290
Annual Min/Max Total for LAB Building 3 (x 20 AHU's) (m3)	10747	25792

Peak Condensate for Building 3 AHU's

AHU	Max. O/A Quantity (L/s)	Peak Air On Moisture Content (kg/kg)	Max. Air Off CC Moisture Content (kg/kg)	Max. Moisture Content Removed (kg/kg)	Max. Coil Condensate (L/s)
UN2400-AHU-0.01	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5001	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5002	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5003	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5004	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5005	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5006	11327	0.011	0.0078	0.0032	
UN2400-AHU-5007	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5008	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5009	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5010	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5011	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5012	11327	0.011	0.0078	0.0032	
UN2400-AHU-5013	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5014	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5015	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5016	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5017	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5018	11327	0.011	0.0078	0.0032	
UN2400-AHU-5019	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5020	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5021	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5022	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5023	11327	0.011	0.0078	0.0032	0.04
UN2400-AHU-5024	11327	0.011	0.0078	0.0032	
		0.011	MAX. TOTAL (L/s)		0.9

= Stand-by Unit

Annual Condensate for Typical Building 4 AHU - normalized for Daytime, Night-time and Monthly Temp and Humidity Variations

Month	Average Moisture Content Removed (kg/kg)	Outdoor Air (1 x AHU)		Coil Condensate (1 x AHU)		Days per Month	Coil Condensate Monthly Total (1 x AHU)		Coil Condensate Monthly Building Total (20 x AHU's)	
		Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L/Day)	Maximum (L/Day)		Minimum Total (m3)	Maximum Total (m3)	Minimum Total (m3)	Maximum Total (m3)
Mar-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Apr-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
May-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Jun-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Jul-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Aug-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Sep-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Oct-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Nov-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Dec-15	0.001	4720	11327	581	1393	31	18	43	360	864
Jan-16	0.001	4720	11327	695	1669	31	22	52	431	1035
Feb-16	0.002	4720	11327	879	2110	28	25	59	492	1182
Mar-16	0.003	4720	11327	1552	3723	31	48	115	962	2309

Annual Min/Max Total for 1 x AHU (m3)	537	1290
Annual Min/Max Total for LAB Building 4 (x 20 AHU's) (m3)	10747	25792

Peak Condensate for Building 4 AHU's

AHU	Max. O/A Quantity (L/s)	Peak Air On Moisture Content (kg/kg)	Max. Air Off CC Moisture Content (kg/kg)	Max. Moisture Content Removed (kg/kg)	Max. Coil Condensate (L/s)
UN2600-AHU-0.01	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5001	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5002	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5003	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5004	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5005	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5006	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5007	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5008	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5009	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5010	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5011	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5012	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5013	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5014	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5015	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5016	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5017	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5018	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5019	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5020	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5021	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5022	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5023	11327	0.011	0.0078	0.0032	0.04
UN2600-AHU-5024	11327	0.011	0.0078	0.0032	0.04
		0.011	MAX. TOTAL (L/s)		0.9

 = Stand-by Unit

Annual Condensate for Typical Building 5 AHU - normalized for Daytime, Night-time and Monthly Temp and Humidity Variations

Month	Average Moisture Content Removed (kg/kg)	Outdoor Air (1 x AHU)		Coil Condensate (1 x AHU)		Days per Month	Coil Condensate Monthly Total (1 x AHU)		Coil Condensate Monthly Building Total (20 x AHU's)	
		Minimum O/A (L/s)	Maximum O/A (L/s)	Minimum (L/Day)	Maximum (L/Day)		Minimum Total (m3)	Maximum Total (m3)	Minimum Total (m3)	Maximum Total (m3)
Mar-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Apr-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
May-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Jun-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Jul-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Aug-15	0.003	4720	11327	1552	3723	31	48	115	962	2309
Sep-15	0.003	4720	11327	1552	3723	30	47	112	931	2234
Oct-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Nov-15	0.003	4720	11327	1551	3722	30	47	112	931	2233
Dec-15	0.001	4720	11327	581	1393	31	18	43	360	864
Jan-16	0.001	4720	11327	695	1669	31	22	52	431	1035
Feb-16	0.002	4720	11327	879	2110	28	25	59	492	1182
Mar-16	0.003	4720	11327	1552	3723	31	48	115	962	2309

Annual Min/Max Total for 1 x AHU (m3)	537	1290
Annual Min/Max Total for LAB Building 5 (x 20 AHU's) (m3)	10747	25792

Peak Condensate for Building 5 AHU's

AHU	Max. O/A Quantity (L/s)	Peak Air On Moisture Content (kg/kg)	Max. Air Off CC Moisture Content (kg/kg)	Max. Moisture Content Removed (kg/kg)	Max. Coil Condensate (L/s)
UN2700-AHU-0.01	4531	0.011	0.0078	0.0032	0.02
UN2700-AHU-0.02	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5001	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5002	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5003	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5004	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5005	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5006	11327	0.011	0.0078	0.0032	
UN2700-AHU-5007	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5008	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5009	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5010	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5011	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5012	11327	0.011	0.0078	0.0032	
UN2700-AHU-5013	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5014	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5015	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5016	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5017	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5018	11327	0.011	0.0078	0.0032	
UN2700-AHU-5019	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5020	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5021	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5022	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5023	11327	0.011	0.0078	0.0032	0.04
UN2700-AHU-5024	11327	0.011	0.0078	0.0032	

MAX. TOTAL (L/s) 0.9

= Stand-by Unit

Appendix 6

Irrigation Flow Results

IRRIGATION FLOW RESULTS



	March-Nov - Maximum					March-Nov - Minimum				
	I (inflow) L/h - March-Nov Max	Cumulative Inflow	Q (outflow) L/h - Max	Tank Volume (L) - Max	Cumulative outflow	I (inflow) L/h - March- Nov Min	Cumulative Inflow	Q (outflow) L/h - Min	Tank Volume (L) - Min	Cumulative outflow
12-1 am	3103	3103	3103	3103	3103	1293	1293	1293	1293	1293
1-2 am	3103	6206	3103	3103	6206	1293	2586	1293	1293	2586
2-3 am	3103	9309	3103	3103	9309	1293	3879	1293	1293	3879
3-4 am	3103	12412	3103	3103	12412	1293	5172	1293	1293	5172
4-5 am	3103	15515	3103	3103	15515	1293	6465	1293	1293	6465
5-6 am	3103	18618	3103	3103	18618	1293	7758	1293	1293	7758
6-7 am	3103	21721	3103	3103	21721	1293	9051	1293	1293	9051
7-8 am	3103	24824	3103	3103	24824	1293	10344	1293	1293	10344
8-9 am	3103	27927	3103	3103	27927	1293	11637	1293	1293	11637
9-10 am	3103	31030	3103	3103	31030	1293	12930	1293	1293	12930
10-11 am	3103	34133	3103	3103	34133	1293	14223	1293	1293	14223
11-12 am	3103	37236	3103	3103	37236	1293	15516	1293	1293	15516
12-1 pm	3103	40339	3103	3103	40339	1293	16809	1293	1293	16809
1-2 pm	3103	43442	3103	3103	43442	1293	18102	1293	1293	18102
2-3 pm	3103	46545	3103	3103	46545	1293	19395	1293	1293	19395
3-4 pm	3103	49648	3103	3103	49648	1293	20688	1293	1293	20688
4-5 pm	3103	52751	3103	3103	52751	1293	21981	1293	1293	21981
5-6 pm	3103	55854	3103	3103	55854	1293	23274	1293	1293	23274
6-7 pm	3103	58957	3103	3103	58957	1293	24567	1293	1293	24567
7-8 pm	3103	62060	3103	3103	62060	1293	25860	1293	1293	25860
8-9 pm	3103	65163	3103	3103	65163	1293	27153	1293	1293	27153
9-10pm	3103	68266	3103	3103	68266	1293	28446	1293	1293	28446
10-11 pm	3103	71369	3103	3103	71369	1293	29739	1293	1293	29739
11-12 pm	3103	74472	3103	3103	74472	1293	31032	1293	1293	31032
	3103	38788	74472		930900	1293	16163	31032		387900
	74472					31032				

