#### **TECHNICAL REPORT 3**

CENTRAL HIGH SCHOOL MID-ATLANTIC REGION ADAM BROWN MECHANICAL OPTION ADVISOR LAURA MILLER

Submitted 11/11/13

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## **Executive Summary**

This report contains the analysis of Central High School's existing mechanical system in place. Included are design objectives and its influences, energy usage, LEED analysis and cost of the system.

Primarily electricity and natural gas are used as the primary energy sources on site. Almost 1.2 million lbm/year of CO2 is produced primarily because of the boiler. This along with other air pollutants should be reduced for the safety and health for people and the environment.

As this building was not built with LEED in mind it has sustainable features. Energy recovery wheels in the energy recovery units are part of the sustainable design and give rebates to the school. Ventilation requirements have been meet and exceeded according to ASHRAE 62.1 standards. Also VFD pumps are used to circulate hot and chilled water throughout the building depending on the demand. LEED Certified is achievable by the mechanical system alone but short 4 points.

The mechanical system costs \$51.89 per square foot of space in the building. Mechanical mezzanines take up the most space followed by the boiler room and mechanical shafts.

## **Building Overview**

### **Building Description**



Central High School is a newly renovated high school located in the Mid-Atlantic region. At roughly 320,000 square feet it is an impressive state of the art school with two levels the top one being the addition. The building has food and science labs, classrooms, offices, gyms and an auditorium to serve the learning needs of the occupants. It is expected to be completed by February 2015.

### **Mechanical System Overview**

Twenty energy recovery units are located throughout the building that delivers outdoor air to fan coil units with recirculated air serving the zones. Along with that, two air cooled chillers and a boiler serve the energy recovery units and fan coil units.

### **Occupant and Project Team**

**Owner: Confidential** 

Construction Manager: Jacobs http://jacobs.com/ Architect: SHW Group, LLP http://www.shwgroup.com/ Structural Engineer: Adtek Engineers, INC. http://www.adtekengineers.com/ Mechanical and Electrical Engineers: SHW Group, LLP http://www.shwgroup.com/ Civil Engineers: Bowman Consulting http://www.bowmanconsulting.com/ Kitchen Consultant: Nyikos Associates http://nyikosassociates.com/ Acoustical and Technology: Polysonics Corporation http://www.polysonics-corp.com/

## **Design Objectives and Requirements**

### **Mechanical System Design Objectives**

The driving force behind the renovation and new construction was to bring Central High School up to date and make it a state of the art school. Even though LEED was not a target for this project creating a mechanical system that would sustain the building was. By doubling the size of the area of the building a central chiller and boiler plant was put in place so that they could handle the new loads on the building. Energy recovery units served from the central plants helped recover much of the energy from exhaust air. The total energy wheels within these units are designed to help keep energy consumption down as a whole for the entire system in place. Fan coil units were also added to help better handle the loads in each zone. Therefore the combination of all three components would hopefully help make Central High School a state of the art school.

### **Mechanical System Design Requirements**

Currently the two main codes that are being followed are ASHRAE Standards 90.1 and 62.1. These two main codes are crucial for design as there are no zoning issues that are being taken into account at this time. Furthermore a stringent commissioning process is in place to make sure that after construction the building's mechanical systems are compliant and run as prescribed per specifications.

## **Site Energy Sources**

The two main sources of energy are electricity and natural gas. Due to the site being so close to the Baltimore, Maryland area typical rates from there were used. Many energy source providers are present in and around the area but the two listed below in Table 1 are the lowest prices per unit. These factors do not include delivery cost, contract length and initial cost to the customer. However with natural gas if the customer goes over the 10,000 therms the cost become \$.1303 per therm.

Source Type	Provider	Price
Electricity	ConEdison Solutions	8.15 cents/kWh
Natural Gas	BGE	\$0.261/therm

Table 1 – Utility Rates

### **Site Factors**

Central High School's mechanical system was renovated and updated with energy recovery units due to the fact that rebates were given if they were chosen to be used. Therefore the mechanical system was re-designed in this case with the idea of using these energy recovery units to receive the rebate.

### **Design Conditions**

Closet to the site is Baltimore, Maryland whose outdoor design conditions are listed in Appendix A. Indoor conditions for the summer time are set to be at 55 degrees Fahrenheit. For winter design conditions the set point varies by each space by the energy recovery unit that serves it which is shown in Appendix A.

### **Design Ventilation Requirements**

In Table 2 below the ventilation rates from the design engineer and calculated rates are compared. Ventilation was increased from the minimum compliance of ASHRAE 62.1 for every energy recovery unit in the building. Therefore the design engineer meet and exceeded the minimum rate required for each space.

	Ventilation Co	mpliance ASHRAE 62.1 -2010	
System	OA Minimum	OA Designed Minimum	OA Provided
ERU-1	5700	9060	11780
ERU-2A/B	1500	2010	3400
ERU- 3	3400	4504	6990
ERU- 4	950	1255	1655
ERU- 5	3410	3070	3500
ERU- 6	430	495	1535
ERU- 7	13235	14598	20130
ERU- 8	16000	21260	28360
ERU- 9	2900	3730	5570
ERU- 10	3070	3531	4700
ERU- 11	1900	2250	4500
ERU- 12/13	7155	15000	21540
ERU- 14	705	1250	2295
ERU- 15	7570	7440	10660
ERU- 16	2235	1800	2170
ERU- 17	2000	3012	4050
ERU- 18/19	11200	13620	18960
ERU- 20	1770	2171	2925

Table 2 – Ventilation Rates

## **Design Heating and Cooling**

Table 3 shows the comparison between the design and calculated heating and cooling loads for the building. Trane TRACE 700 was the program used for the model. Information for the design part was taken from drawings and specifications since the energy model was not released for comparison. The model shows a difference of almost 1.3 and 1.1 times more cooling and heating, respectively, needed than what the building systems were designed to. Therefore factors such as equipment, lighting and shading were assumed and would account for the differences between the design and model load calculations.

	Design	Model
Cooling [tons]	505	678
Heating [MBH]	11289	13147
Cooling [sf/ton]	634	472
Heating [Btuh/sf]	35	41
Supply [cfm/sf]	0.51	1.22
Ventilation [cfm/sf]	0.48	0.41

Table 3 – Heating and Cooling Loads

### **Energy Usage**

Also from the Trane TRACE 700 model is the energy usage for the building on a monthly basis for the year shown in Figure 1 below. Electric and natural gas use were broken down into on and off peak demand times to show how much was being used during those periods. No comparison could be made with the mechanical engineer's energy calculations for the building.

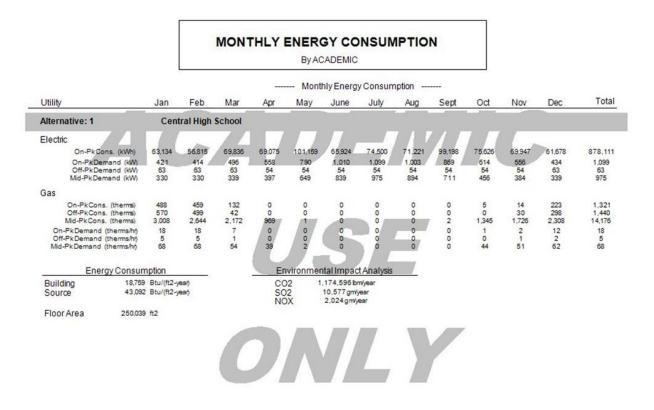


Figure 1 – Energy Usage

### **Mechanical Schematic - Water Side**

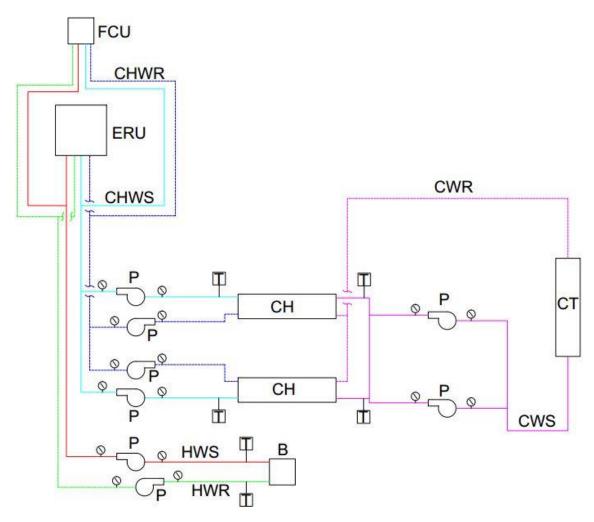


Figure 2 – Mechanical Schematic – Water Side

Central High School has a central plant for the water side of its mechanical system as laid out in Figure 2. Two chillers create chilled water that is pumped to the energy recovery units and fan coil units. After use the chilled water is then returned to the chillers where the heat is rejected to a refrigerant that rejects heat to a water loop. From there the heat is rejected to the outdoor air through the use of a cooling tower. For heating a natural gas boiler creates hot water for both the energy recovery units and fan coil units. After use the hot water is returned back to the boiler.

### Mechanical Schematic – Air Side

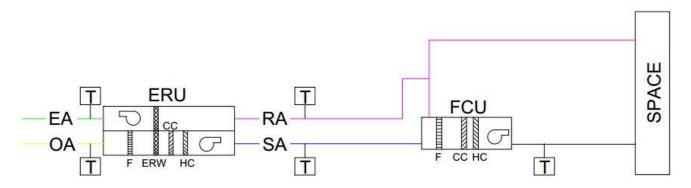


Figure 3 – Mechanical Schematic – Air Side

The two main pieces of mechanical equipment that deliver air to the space are energy recovery units and fan coil units as laid out in Figure 3. Outdoor air is pulled through the energy recovery unit and then pumped through the duct work to the fan coil unit. Return and outdoor air are mixed within the plenum and the fan coil unit then supplies this mixed air to the space. Afterwards some return is exhausted through the energy recovery unit to the outside of the building.

### **System Operation – Water Side**

When the building requires cooling the chillers produce chilled water to meet this demand. Chilled water from the chillers is pumped by two VFD pumps that have pressure gauges on both the suction and discharge sides shown in Figure 2. This will tell the pumps how much flow the spaces need in order to satisfy the heating loads. Both the energy recovery units and fan coil units require chilled water to meet the load demand. After satisfying the loads water is returned by two VFD pumps to the chillers where the refrigerants R-134A and R-22 take the heat and reject it to a water loop. That water is then run through a cooling tower and the heat is rejected to the outdoor air. Two more VFD pumps then pump the now chilled water through the chillers to be distributed to the energy recovery units and fan coil units. Thermometers are set and calibrated on both the supply and return side of the chillers to make sure the correct temperature of chilled water is made depending on the demand of the loads.

### System Operation - Air Side

Fresh outdoor air is pulled through the energy recovery unit that goes through a filter, energy recovery wheel, cooling coil and then a heating coil. The addition of the energy recovery wheel allows the heating coil to not work as hard especially when the outdoor air is at a freezing temperature. A thermostat is placed on both the outdoor, supply, return and exhaust ends of the energy recovery unit shown in Figure 3. This controls how much the air needs to be conditioned and if the energy recovery wheel needs to operate. Outdoor air is pumped through the ductwork to fan coil units where it mixes in the plenum space with return air. The amount of return air mixed with outdoor, return and supply sides. A carbon monoxide sensor system is in place to make sure the levels within the spaces does not exceed a certain amount that would be harmful to the occupants. Exhaust systems for labs, bathrooms, kitchens, and equipment rooms were omitted from this schematic.

### **Mechanical Systems Cost**

Table 4 gives the total first cost of the mechanical system to be put into place for the building. It is above \$16.6 million that is then spread out over an area of 320,000 square feet. This gives a cost per square foot for the entire mechanical system to be about \$52. However the school is getting a rebate by using energy recovery units which has not been factored in for the initial cost.

Total First Cost	\$16,604,704.00
Cost per sq. ft.	\$51.89

Table 4 – Mechanical System Cost

## **Major Mechanical Equipment**

Listed in Table 4 are the major pieces of mechanical equipment. This list includes heating and cooling equipment along with air distribution units.

	Γ		Major Mechanio	cal Equipment			0.05 0.05 0.05 0.05 0.05 0.05 0.50 0.50
Tag	Equipment	Input/Out	mut (MBH)	May Pre	ssure (lb)		
Tug	Equipment	mput/out	.put (MDH)	IVIAX I TO	.33010 (15)		
B-1	Cast Iron Boiler	9805	/7872		40		
		Load/Sou	rce (GPM)				
117.1	Lleat Evehander	F.00	15.40			Image: constraint of the sector of	
HX-1	Heat Exchanger	500	/540				
		biler 9805/7872	Evaporator	Flow (GPM)			
			. , ,	•	<b>x</b> <i>y</i>		
CHL-3	Air Cooled Chiller			5	540		
CHL-4	Air Cooled Chiller	3.	52		92		
		CDM	Llood (ft)	UD	DDM	Efficiency (0/)	
		GPIVI	Head (ft)	HP	RPM	Efficiency (%)	
P-1A/B	VFD Pump - Boiler	1675	122	75	1750	84.8	
P-2A/B	VFD Pump - Chillers				1750		<ul> <li>I</li></ul>
P-3A/B	VFD Pump - Chillers	2000	110	75	1750	82.7	
P-4A/B	VFD Pump - Chillers	1560	80	50	1750	85.3	
			(	• •			
		Tank Vol	ume (Gal)	Acceptance	Volume (Gal)		
ET-1	Expansion Tank	3	00		300		
			00				
		GI	PM				
AS-1	Air Seperator						
AS-2	Air Seperator	5	40				
			Capacity (MBH)				
			Capacity (WDH)				
CU-1	Air Cooled Conde	ensing Unit	18				
CU-2	Air Cooled Conde	ensing Unit	12				
CU-3		-					
CU-4	Air Cooled Conde	ensing Unit	48				
		Supply (CEM)	Exhaust (CEM)	Total GPM	Cooling (MBH)	Heating (MPH)	EP W/bool (HP)
		Suppry (Crivi)	Exhlaust (CLIVI)		Cooling (WBH)	Treating (MBH)	LIX WHEET (TIP)
ERU-1	Energy Recovery Unit	12100	10800	141.8	484.3	609.9	0.05
ERU-2A/B	Energy Recovery Unit	1700	1650	18.4	65.1	66.7	0.05
ERU-3	Energy Recovery Unit	6990	6790	61.9	166.6	313.5	0.05
ERU-4	Energy Recovery Unit				40.5		
ERU-5	Energy Recovery Unit				222.9		
ERU-6	Energy Recovery Unit Energy Recovery Unit				40.5 840.7		
ERU-7 ERU-8	Energy Recovery Unit Energy Recovery Unit				840.7 1160		
ERU-9	Energy Recovery Unit				196.5		
ERU-10	Energy Recovery Unit				171		
ERU-11	Energy Recovery Unit	8480	4500	95.9	333.3		0.05
ERU-12	Energy Recovery Unit				395		
ERU-13	Energy Recovery Unit				395		
ERU-14	Energy Recovery Unit				50.7		
ERU-15	Energy Recovery Unit				395		
ERU-16 ERU-17	Energy Recovery Unit Energy Recovery Unit				154.4 110.4		
ERU-17	Energy Recovery Unit				385.4		
ERU-19	Energy Recovery Unit				385.4		
ERU-20	Energy Recovery Unit				71.1		

## Mechanical System Space Usage

The total amount of space usage by the mechanical system, listed in Table 5, is 9925 square feet. The majority of it is taken up by mechanical mezzanines where the energy recovery units sit. Chillers and boilers are in the boiler room and take up the second most amount of space. Shafts for the ducts take up the least amount of space in the building. Comparing the total amount of area the mechanical system takes up in comparison with the rest of the building comes out to be about 3 percent.

Mechanical Space	Area (sf)
Boiler Room	3847
Mechanical Mezzanines	5574
Shafts	504
Total	9925
Building	320000
Building Space Usage	3.10%

Table 6 – Mechanical Space Usage

#### **LEED Rating**

To make Central High School LEED certified is not a goal of the current project team or the owner. Sustainable features such as low flow toilets were put in place however. The point total for the mechanical system is 32 points making the building close to LEED Certified by 4 points. In Energy and Atmosphere the points came from the rigorous verification and commissioning process that is going to take place when the building is finished. Also optimizing energy performance with energy recovery units and state of the art controls on the chillers, boilers and pumps gave the assumed maximum amount of points possible. For Indoor Environmental Quality the design team put outdoor air monitoring devices on the energy recovery units along with increasing ventilation from ASHRAE standards. Controls for pollutants and chemicals are set up to ensure the best quality air is delivered to the occupants. Finally thermal comfort controls are in place and the curtain wall systems allow for daylight and views.

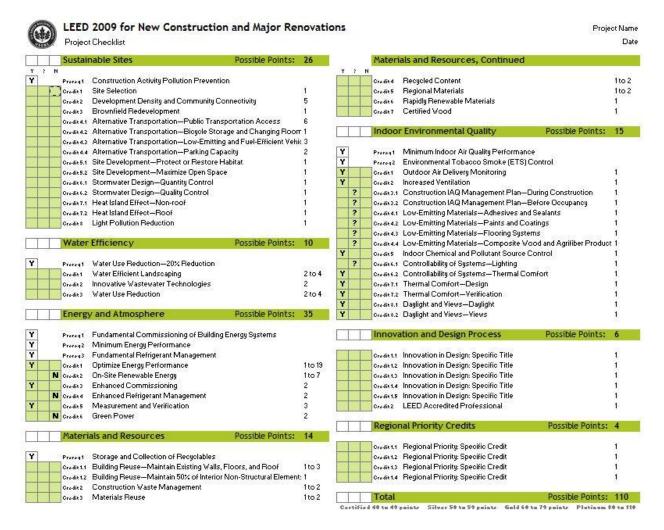


Figure 4 – LEED Checklist

### **Overall System Evaluation**

The mechanical system at Central High School has done a good job for sustainability and energy efficiency. Through the use of energy recovery units the building is not only more efficient but will receive rebates for using them. At over 16.6 million dollars the project cost associated with the mechanical system will be reduced by utilizing these energy recovery units.

Since the high school is at 320,000 square feet it requires a large mechanical system to deal with heating and cooling loads. Two chillers and a natural gas fired boiler are the primary means of heating and cooling in the building. There is not much in the way of redundancy for heating but for cooling the extra chiller provides such a means for backup. Also the ventilation rates are well above that of the ASHRAE 62.1 standards minimum requirements.

A thorough and rigorous commissioning process is in place when the building is done with the renovation and addition. This will ensure that the mechanical system should function as well as it was designed to be. Along with this the maintenance will be easy since the energy recovery units are in mechanical mezzanines. The fan coil units are located above the spaces and therefore are easy to access in case problems occur with them.

### References

ConEdison Solutions electricity rate. https://electricityrates.com/results/?zipCode=21122#21122MDBGENonRnwbl

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LEED 2009 rating system. http://www.usgbc.org/leed/rating-systems/new-construction

SHW Group LLP "Final Bid Set". Reston, Virginia.

Central High School "Master Specifications".

ASHRAE. Standard 62.1-2010, Ventilation for Acceptable Indoor Air Quality. Atlanta, GA. American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

ASHRAE. Standard 90.1-2010, Energy Standards for Buildings Except Low-Rise Residential Buildings. Atlanta, GA. American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

## Appendix A

Baltimore, Maryland (Baltimore-Washington) outdoor design conditions.

Image: 1							Heating DB		101.0	Cooling	Cooling DB/MCWB			Evapo	Evaporation WB/MCDB	VB/MC	DB	Dchu	Dehumidification	tion DF	DP/HR/MCDB	CDB	H	Extreme	•	Heat	Heat./Cool.		
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DALE AFFE         DALE AFFE <thdale affe<="" th=""> <thdale affe<="" th=""> <thd< td=""><td>DALE ARE         3389         913         13         137         136         910         13         137         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136</td><td>Duble ARIS         3389         913         513         633         <th< td=""><td>ALEXANDRIA INT</td><td>31.34N</td><td>92.56W</td><td>79</td><td></td><td>-</td><td>5</td><td></td><td></td><td></td><td>76.8</td><td>80.7</td><td>89.5</td><td>79.8</td><td>+</td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td>-</td><td>1835</td><td>2621</td></th<></td></thd<></thdale></thdale>	DALE ARE         3389         913         13         137         136         910         13         137         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136         136         137         136	Duble ARIS         3389         913         513         633 <th< td=""><td>ALEXANDRIA INT</td><td>31.34N</td><td>92.56W</td><td>79</td><td></td><td>-</td><td>5</td><td></td><td></td><td></td><td>76.8</td><td>80.7</td><td>89.5</td><td>79.8</td><td>+</td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td>-</td><td>1835</td><td>2621</td></th<>	ALEXANDRIA INT	31.34N	92.56W	79		-	5				76.8	80.7	89.5	79.8	+						_		-	1835	2621		
ITTREGNETTIONE 00191 UP 35 313 31 35 77 31 31 30 45 75 30 77 30 31 30 45 75 30	ITTERON(R. 2019) 019W 73 255 313 915 775 912 773 912 80 80 833 75 913 812 753 812 81 91 813 813 814 14 814 14 81	CUCCE-MENT         3038         9138         916         75         917         910 <th< td=""><td>3ARKSDALE AFB</td><td></td><td>93.66W</td><td>167</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>76.5</td><td>80.0</td><td>90.8</td><td>79.0</td><td>-</td><td>-</td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td>2291</td><td>2305</td></th<>	3ARKSDALE AFB		93.66W	167		-					76.5	80.0	90.8	79.0	-	-					_			2291	2305		
ETERONL         3013         316         44         75         32         77         31         36       <	Internet         Number of the second se	Internet         Distribution	SATON ROUGE METRO R		91.15W	75							76.9	80.4	89.0	79.8	_									1573	2709		
Huktishint         3118         914         778         928         775         912         778         912         912         778         912 <th< td=""><td>Induction         313         914         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         723         723         7</td><td>REALESAINI         2318         2317         2318         2318         2317         2318</td><td>AFAYETTE RGNL</td><td>30.21N</td><td>W66.16</td><td>43</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td>77.3</td><td>80.7</td><td>88.9</td><td>80.0</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td>-</td><td>1463</td><td>2806</td></th<>	Induction         313         914         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         773         923         723         723         7	REALESAINI         2318         2317         2318         2318         2317         2318	AFAYETTE RGNL	30.21N	W66.16	43		_					77.3	80.7	88.9	80.0	-						_		-	1463	2806		
RENGL         2518         0.03         0.33         0.73         0.03         0.83         0.03         0.83         0.03         0.83         0.03         0.13 <th0.13< th="">         0.13         0.13         <th< td=""><td>BERGN         3231         313         311         323         311         323         311         313&lt;</td><td>BERON.         3237         311         373         321         323         321         323         321         323</td><td>AKE CHARLES MUNI</td><td>30.13N</td><td>93.23W</td><td>10</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td>77.6</td><td>81.4</td><td>88.5</td><td>80.4</td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td>1453</td><td>2806</td></th<></th0.13<>	BERGN         3231         313         311         323         311         323         311         313<	BERON.         3237         311         373         321         323         321         323         321         323	AKE CHARLES MUNI	30.13N	93.23W	10		_					77.6	81.4	88.5	80.4							_			1453	2806		
The Network with the set of	The Link Single S	LLENSNORS/NF         3958         9578         91         75         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75         91         75	AONROE RGNL	32.51N	92.04W	82		_	5				77.0	81.0	91.4	80.1							_			2189	2462		
The control of	The control of	Distribution         Distribution<	JEW ORLEANS NAS JRB		WE0.09	0		_					77.6	81.9	87.5	80.6							_			1444	2626		
DORTONLYON         3349         6973         6973         7973         6973         7973         6973         7973         6973         7973	DRY INDUNCIANS         D343         D37         D35	ORT         OR	IEW ORLEANS/MOISANT	N99.99N	90.25W	20							77.5	80.9	88.9	80.2							_			1286	2925		
DDRF REGONAL         2348         9,7,7,W         3,5,7,4         1,4	Derr Freichnund         3.3.8         3.0.7	Derr Frouwnich         33.88         93.79         33.6         93.7         55         5	AKEFRONT	30.04N	90.03W	10							9.77	81.4	89.3	80.6		-					_			1138	3232		
DBRF REGIONL         23-58         932         73-51         73-71	DBRF REGIONAL         23-58         952         754         655         756         751         757         758         757         758         751         751         751         751         751         756         757         756         756         757         756         757         756         757         756         757         756         757         756         757         756         757         756         757         756         757         756         757         756         757         756         757         756         756         757         756	DEMERTEGIONL         7.34N         9.35         7.15	HREVEPORT DOWNTOWN	32.54N	93.74W	180		_					76.2	79.6	91.3	78.8	_						-			2149	2628		
Naturely Nat	Nerversen, with the second of	Newyerondimentational and the second	HREVEPORT REGIONAL		93.82W	259		-	Ś				76.0	79.4	91.2	78.6							19.7		-	2117	2535		
NLEWSTONMUNI 44108 (85.2W )34 5.2 10 87.9 707 841 602 810 675 735 85.4 71.3 802 071 11.7 81 68.2 10.6 77.7 23 195 777 703 705 778 78 79.9 105 777 78 78 79.9 105 777 73 75 75 75 75 75 75 75 75 75 75 75 75 75	NIEWENDNMUN         4408         Constrained         Constrained <thc< td=""><td>NILWENONMUN H4087 NUN 4408 NUN 4448 NUN 4408 NUN 4448 NUN AUX AUX AUX AUX AUX AUX AUX AUX AUX AUX</td><td>ine</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>s, 16 more</td><td>on CD-</td></thc<>	NILWENONMUN H4087 NUN 4408 NUN 4448 NUN 4408 NUN 4448 NUN AUX	ine																							s, 16 more	on CD-		
RNUT,         4308         05.801         73         85.11         73.2         85.11         73.2         85.11         73.2         85.11         73.2         85.11         73.2         85.11         73.2         85.11         73.2         85.11         73.2         85.11         73.2         85.1         73.2	Rhv.Li         Hall (88, NL)         Hall (18, NL) </td <td>MRNL.         MRNL         <t< td=""><td>UBURN LEWISTON MUNI</td><td>44.05N</td><td>70.28W</td><td>289</td><td></td><td></td><td>6</td><td>7 83.</td><td></td><td>81.0</td><td></td><td>73.6</td><td>83.4</td><td>71.4</td><td>5</td><td></td><td></td><td>5</td><td></td><td></td><td></td><td></td><td></td><td>7632</td><td>308</td></t<></td>	MRNL.         MRNL         MRNL <t< td=""><td>UBURN LEWISTON MUNI</td><td>44.05N</td><td>70.28W</td><td>289</td><td></td><td></td><td>6</td><td>7 83.</td><td></td><td>81.0</td><td></td><td>73.6</td><td>83.4</td><td>71.4</td><td>5</td><td></td><td></td><td>5</td><td></td><td></td><td></td><td></td><td></td><td>7632</td><td>308</td></t<>	UBURN LEWISTON MUNI	44.05N	70.28W	289			6	7 83.		81.0		73.6	83.4	71.4	5			5						7632	308		
WICKINAET 1398 ND 993W 75 22 1863 710 823 663 713 824 713 824 713 824 713 88 71 1121 78 66 703 105 77 70 113 740 723 101 113 75 703 73 75 75 75 75 75 75 75 75 75 75 75 75 75	WICK (AAS)         436N 70.00 0.90 W         7         21         837 71         837 71.5         834 71.5         834 71.5         836 71.1         1314 7.5 <th< td=""><td>NUCKANŠUFT (1908) W (11) (11) (11) (11) (11) (11) (11) (</td><td>ANGOR INTL</td><td>44.81N</td><td>68.82W</td><td>194</td><td></td><td></td><td></td><td></td><td></td><td></td><td>67.0</td><td>73.2</td><td>83.1</td><td>71.3</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td>-</td><td>7665</td><td>355</td></th<>	NUCKANŠUFT (1908) W (11) (11) (11) (11) (11) (11) (11) (	ANGOR INTL	44.81N	68.82W	194							67.0	73.2	83.1	71.3							-		-	7665	355		
NUMUNUL, ET         454N         7.0         2.1         1.0         7.1         8.2         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         8.1         7.1         8.1         8.1         7.1         8.1         8.1         7.1         8.1         8.1         7.1         8.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         8.1         7.1         7.1 <t< td=""><td>NUMENL, EF         4540         0.0         8.6         7.1         8.2         7.2         8.1         7.1         <th< td=""><td>WNDNTNLET         458 (1) 70.3W         233 (1) 51 (1) 70.3         231 (1) 51 (1) 70.3         231 (1) 71 (1)</td><td>RUNSWICK (NAS)</td><td>43.90N</td><td>69.93W</td><td>75</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>67.3</td><td>73.5</td><td>82.4</td><td>71.5</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>7202</td><td>367</td></th<></td></t<>	NUMENL, EF         4540         0.0         8.6         7.1         8.2         7.2         8.1         7.1 <th< td=""><td>WNDNTNLET         458 (1) 70.3W         233 (1) 51 (1) 70.3         231 (1) 51 (1) 70.3         231 (1) 71 (1)</td><td>RUNSWICK (NAS)</td><td>43.90N</td><td>69.93W</td><td>75</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>67.3</td><td>73.5</td><td>82.4</td><td>71.5</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>7202</td><td>367</td></th<>	WNDNTNLET         458 (1) 70.3W         233 (1) 51 (1) 70.3         231 (1) 51 (1) 70.3         231 (1) 71 (1)	RUNSWICK (NAS)	43.90N	69.93W	75		-					67.3	73.5	82.4	71.5							-			7202	367		
WASPECANDE         43.3N         70.7NN         243         71         81.5         71.4         84.6         71.1         81.6         71.7         10.6         71.7         20         81.8         73.64         4000         71.7         20         81.6         70.1         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.64         7000         73.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.7         71.6         71.7         71.7         71.7         71.6         71.7         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7         71.6         71.7	We AFBCAMPS         3833         710         823         710         823         711         841         711         841         731         <	MCML         41.3N         7.70N         243         6.2         39.3         7.10         82.3         7.41         86.7         7.41         86.7         7.4         81.9         7.11         4.81         7.17         20.9         15.6         81.3         7.41         27.3         21.9         7.17         31.6         31.6         31.6         31.6         31.7         31.7         31.7         31.7         31.6         31.7         31.7         31.7         31.7         31.6         31.7         31.7         31.7         31.7         31.6         31.7         31.7         31.7	ORTLAND/INTNL. JET	43.64N	70.30W	62		_					68.2	74.1	83.2	72.2							-			7023	370		
WARRAMPS         38.83 (5.83W (38) (36) (34)         15         11         21         31.84         71         31.84         71         31.84         71         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.84         41.9         73         31.8         73         31.6         73.1         31.6         31.7         31.6         31.7         31.6         31.7         31.6         31.7         31.6         33.7         31.7         31.6         31.7         31.6         33.7         33.7         31.7         31.6         33.7         31.7         31.6         31.7         31.6         33.7         31.7         31.6         31.7         31.6         33.7         31.7         31.6         33.7         33.7         31.7         31.7         31.6         33.6         33.7         33.7         31.7         31.7	WSARBCAMPSP         38.83         7.68W         39         15         71         31.15         71         31.15         71         31.15         71         31.15         71         31.15	WS-RFIGAMPS         Signal Allowed         Signal All	ANFORD RGNL	43.39N	70.70W	243		-				82.0	67.8	74.1	84.6	72.1							-			7470	350		
WB: WB: MB: MORE         338 N 76.8W         341         10         73         87         10         71         11         73         11         73         11         73         11         73         13 <th< td=""><td>MARIN         Mark         <t< td=""><td>WS-RBCAMPSP         382N 7668W         389         15         141         15         143         145</td><td>ryland</td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>es, 4 more</td><td>on CD-</td></t<></td></th<>	MARIN         Mark         Mark <t< td=""><td>WS-RBCAMPSP         382N 7668W         389         15         141         15         143         145</td><td>ryland</td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>es, 4 more</td><td>on CD-</td></t<>	WS-RBCAMPSP         382N 7668W         389         15         141         15         143         145	ryland					_															-			es, 4 more	on CD-		
Sportware         Sport Signed Si	OREWNSHINGTO         3917N 566W         15         14.0         77.3         17.8         8.6         7.5.3         13.1         2.1         7.1         1.5.3         1.9.6         1.7.3         30.0         7.2.3         1.1.1         4.5.3         1.3.6         1.9.6         1.9.6         1.9.6         1.9.7         31.6         2.3         1.1.1         4.5.7         1.8.8         7.7.3         1.6.7         0.0.3         2.5.3         1.3.7         31.6         2.3.7         1.3.8         1.1.6.7         1.0.8         1.1.8.8         1.0.3         30.0         2.7.3         1.8.8         7.2.3         1.1.6         2.7.3         1.1.6.7         1.0.8         1.1.8.8         1.0.3         30.0         2.7.3         38.0         7.3         1.8.3         2.7.3         1.8.3         2.7.3         1.8.3         2.7.3         1.8.3         2.7.3         2.	SPONT         Start         Start <th< td=""><td>NDREWS AFB/CAMP SP</td><td>38.82N</td><td>76.85W</td><td>289</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>77.6</td><td>86.6</td><td>76.3</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>4419</td><td>1199</td></th<>	NDREWS AFB/CAMP SP	38.82N	76.85W	289		_						77.6	86.6	76.3	6						-			4419	1199		
Stort         Stort <th< td=""><td>Stort         38.00         75.44         37.1         36.2         37.7         36.2         36.3         37.7         36.5</td><td>Story         Story         Start         <th< td=""><td>ALTIMORE-WASHINGTO</td><td>39.17N</td><td>76.68W</td><td>154</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>78.1</td><td>88.6</td><td>76.8</td><td>9</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>4552</td><td>1261</td></th<></td></th<>	Stort         38.00         75.44         37.1         36.2         37.7         36.2         36.3         37.7         36.5	Story         Story         Start         Start <th< td=""><td>ALTIMORE-WASHINGTO</td><td>39.17N</td><td>76.68W</td><td>154</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>78.1</td><td>88.6</td><td>76.8</td><td>9</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>4552</td><td>1261</td></th<>	ALTIMORE-WASHINGTO	39.17N	76.68W	154		_						78.1	88.6	76.8	9						-			4552	1261		
Mate         Matrix         Matrix <th matrix<="" t<="" td=""><td>Mate         Mate         Mate&lt;</td><td>Matrix         Matrix         <th matrix<<="" td=""><td>HOMAS POINT</td><td>38.90N</td><td>76.43W</td><td>39</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>79.6</td><td>82.7</td><td>77.8</td><td>5</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>4196</td><td>1236</td></th></td></th>	<td>Mate         Mate         Mate&lt;</td> <td>Matrix         Matrix         <th matrix<<="" td=""><td>HOMAS POINT</td><td>38.90N</td><td>76.43W</td><td>39</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>79.6</td><td>82.7</td><td>77.8</td><td>5</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>4196</td><td>1236</td></th></td>	Mate         Mate<	Matrix         Matrix <th matrix<<="" td=""><td>HOMAS POINT</td><td>38.90N</td><td>76.43W</td><td>39</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>79.6</td><td>82.7</td><td>77.8</td><td>5</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>4196</td><td>1236</td></th>	<td>HOMAS POINT</td> <td>38.90N</td> <td>76.43W</td> <td>39</td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>79.6</td> <td>82.7</td> <td>77.8</td> <td>5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>4196</td> <td>1236</td>	HOMAS POINT	38.90N	76.43W	39		_						79.6	82.7	77.8	5						-			4196	1236
TABLE MONIDOA         41:07 N 0:35 %         51         73         121         77         721         721         77         721         77         721	TABLE MONIDOA         41.56         51.5         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         54.7         53.5         55.7         53.5         56.7         53.5         55.7         53.5         56.7         53.5         53.5         54.7         53.5	TABLE         TABLE <th< td=""><td>ssachusetts</td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td>-</td><td>s, 10 more</td><td>on CD-</td></th<>	ssachusetts					-									_						-		-	s, 10 more	on CD-		
MNUNI         4.258 N10W         30         81         7.3         7.5         5.5         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         7.4         8.7         8.4         8.4         8.4         7.4         8.7         8.4         8.4         7.4         8.7         8.4         8.4         7.4         8.7         9.7	MNININI         42.887         11.06         75.8         25.7         74.8         73.1         75.9         35.7         34.8         75.8         75.9         35.9	MNNUNI         42.80         11.06         75.0         15.9         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         15.3         75.7         75.3         15.3         75.7         15.3	ARNSTABLE MUNI BOA		70.28W	52	9.9 15.	_					70.2	75.5	81.3	74.2					_		-			5872	511		
ADMUNI         H108N 091W         69         124         171         123         81         705         715         84         715         75         84         74         75         76         71         75         76         71         75         70         75         75         76         71         75         76         71         75         76         76         76         76         76 <td>ADMINI         41.088 0100 W         50         124         125         70.5         71.6         73.5         84.8         73.5         75.7</td> <td>ADMUNI         HIANN         MAL NA         MAL NA<!--</td--><td>SOSTON/LOGAN INIL</td><td></td><td>W10.17</td><td>30</td><td></td><td>_</td><td></td><td></td><td></td><td></td><td>70.2</td><td>6.61</td><td>85.7</td><td>74.3</td><td></td><td></td><td></td><td></td><td>-</td><td></td><td>-</td><td></td><td></td><td>2596</td><td>750</td></td>	ADMINI         41.088 0100 W         50         124         125         70.5         71.6         73.5         84.8         73.5         75.7	ADMUNI         HIANN         MAL NA         MAL NA </td <td>SOSTON/LOGAN INIL</td> <td></td> <td>W10.17</td> <td>30</td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td>70.2</td> <td>6.61</td> <td>85.7</td> <td>74.3</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>-</td> <td></td> <td></td> <td>2596</td> <td>750</td>	SOSTON/LOGAN INIL		W10.17	30		_					70.2	6.61	85.7	74.3					-		-			2596	750		
NAMINI         41.00         0.11         12.1         83.7         14.80         0.5         75.1         83.7         75.4         83.7         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         75.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.3         86.7         75.1         95.7         75.3         86.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.3         95.7         75.1         95.7         75.3         95.7         75.1         95.7         75.1         95.7         75.1         95.7         75.1	AMMUNI         4120N 10.90W         01         17         821 7.23         837 7.16         831 7.05         751 8.02         753 8	AMMUNI         4100 No 909 Mo 11/1         121 No 10 with 10 mo 11/2         121 No 10 with 10 mo 11/2         121 No 10/2         121 No	3UZZARDS BAY	41.38N	71.03W	36		_					N/A	N/A	N/A	N/A							-			5552	302		
NACENINI 42.27 N 71.12W 148 34 95 904 757 84.8 74.5 74.8 74.5 757 724 123 767 224 1203 761 204 186 700 1462 600 1462 600 1462 600 1462 600 1462 600 1462 600 1460 1460 156 600 1460 156 600 1460 156 600 176 156 156 156 156 156 156 156 156 156 15	NCENNIX 4120Y 71,12W 448 34 95 904 732 857 712 813 712 91 700 757 848 743 85 728 723 758 724 1193 791 201 759 868 200 755 758 751 758 751 1193 791 201 758 867 758 855 749 829 751 1234 757 241 1193 791 251 758 751 1408 759 255 841 744 809 751 1234 757 241 1204 758 251 129 779 858 200 7175 8541 744 813 752 1193 791 251 259 259 179 179 173 857 753 758 751 752 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 758 751 751 758 751 751 758 751 751 751 758 751 751 758 751 751 758 751 751 758 751 752 753 753 753 753 753 753 753 753 753 753	NGENUNI 4277 112W 148 34 95 904 757 848 74 75 848 74 75 84 75 123 75 724 120 76 20 75 86 75 20 75 80 75 124 86 75 123 76 20 75 86 75 20 75 80 75 124 80 75 123 76 20 75 86 75 10 75 86 75 10 75 86 75 10 75 75 80 75 10 75 75 80 75 10 75 75 80 75 10 75 75 80 75 10 75 75 75 75 75 71 120 77 75 75 75 71 120 77 75 75 75 71 120 77 75 75 75 72 10 75 75 73 75 72 10 75 75 73 10 75 75 75 75 70 75 75 75 75 75 71 10 75 75 75 75 71 10 75 75 841 74 80 75 1123 77 72 120 77 75 23 10 77 75 23 10 75 75 73 10 75 75 73 75 72 10 75 75 73 10 75 75 75 71 10 75 75 841 74 81 77 72 123 77 72 120 77 75 72 120 77 75 72 120 77 58 72 120 75 75 71 85 71 85 71 85 71 85 71 85 71 75 70 115 76 10 115 76 10 115 76 11 20 75 75 71 139 79 179 15 123 78 72 110 75 76 75 173 76 70 115 17 10 75 76 70 115 17 10 75 76 70 115 17 10 75 76 70 115 17 10 75 76 71 139 77 10 170 75 76 71 139 79 110 70 115 17 10 70 10 10 10 10 10 10 10 10 10 10 10 10 10	CHATHAM MUNI		M66.69	69		_					70.5	75.1	80.2	73.9	_				_					2688	451		
DARONEXAL         41.08 N 70.02W         9         55         41.1         71.2         72.2	ANDRIME         41.083         75.25         81.1         71.2	AS VINEXAD         410         887         72         81         71	AWRENCE MUNI		71.12W	148		_					70.7	75.7	84.8	74.3	_				_		-			1609	652		
DD00BD         Current         41.05         53.0         53.7         54.4         53.1         53.1         51.0         73.1         53.7         54.4         50.6         73.1         53.1         50.4         73.1         53.7         54.4         50.7         53.1	DD000BX         41.05         58.37         74.4         50.31         31.1         21.04         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.8         21.10         77.1         83.0         73.3         84.1         70.8         74.4         81.1         75.3         23.1         91.1         91.7         93.3         91.7         93.8         71.4         80.7         73.3         83.7         74.4         81.1         75.2         100.7         75.8         73.2         100.7         75.8         73.3         93.7         74.4         83.7         74.1         83.7         74.1         83.7         74.1         83.7         74.1         83.7         74.1         83.7         74.1         83.7         74.1         83.7         76.1         83.7	DO MEM 4108 NULL 4188 70 9 87 11 887 723 841 708 758 857 744 807 731 1234 775 1034 775 725 1036 775 725 1037 775 721 929 775 1037 775 729 735 1047 757 725 725 1037 757 725 729 735 1047 757 725 729 735 725 1037 757 725 729 735 725 725 725 725 729 775 729 739 735 731 739 731 731 739 738 757 735 737 735 744 803 758 757 725 749 829 735 1121 751 752 729 185 751 159 794 185 550 749 855 749 858 749 858 749 858 724 1207 751 759 739 187 721 1197 794 185 550 749 858 749 858 724 1257 761 750 750 756 755 759 751 15197 794 185 550 749 858 724 1257 794 177 1215 778 701 1151 761 759 239 977 756 759 756 854 740 858 749 858 712 847 717 712 794 717 1215 778 701 1151 761 759 299 197 6766 756 751 759 759 751 751 759 759 751 751 759 759 756 854 750 854 752 847 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 746 854 748 836 732 814 712 751 799 1205 800 247 731 5990 7418 770 111 750 759 854 750 854 753 853 744 820 732 1222 800 247 731 5990 7418 770 111 750 759 854 732 831 734 1252 739 1204 793 231 221 919 6615 6118 881058 851 744 826 712 853 744 826 717 1204 793 231 221 919 6615 6118 881058 851 744 826 717 826 733 733 813 734 810 717 1204 793 231 210 910 665 161 8840 788 728 835 714 820 734 835 732 832 733 122 939 6415 7568 851 744 826 717 826 733 831 734 810 717 1204 793 231 210 910 665 161 8840 880 722 102 837 738 857 728 833 714 820 734 1327 734 819 717 7104 793 231 210 910 665 161 8840 838 720 833 732 835 732 835 738 853 744 820 734 1327 734 810 717 71204 793 231 210 910 665 161 844 748 738 853 744 820 753 853 744 820 734 743 857 728 730 853 744 820 733 731 8107 777 732 914 910 777 732 914 910 750 732 1202 900 247 138 750 844 744 820 753 853 744 820 732 1222 900 247 249 910 753 854 740 859 710 750 844 743 822 732 1732 800 741 853 811 744 740 753 864 177 720 809 718 1222 794 910 778 854 710 820 722 1223 910 773 852 744 820 844 743 822 732 732 732 739 800 7178 120 793 244 160 758 877 718 820 760 738 877 718 820 761 844 743 822 732 1732 800 718 772 1209 793 184 665 744	AARTHAS VINEYARD		70.62W	69		_					70.0	75.2	80.9	73.9					-		-			5886	429		
OUD MUNC         Mathematical         41.01 N 071 LW         0.31         9.35         7.31         8.36         7.49         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.37         7.33         8.31         7.11 N 0.37         9.35         7.33         8.37         7.33         8.37         7.33         8.37         7.33         7.34	OUD MUNCIPAL         4191/N 71,1/W         9         31<	OUDMUNC         41.91N         0.73W         148         3.3         9.1         9.35         7.31         8.10         7.32         13.07         7.83         13.1         9.31	VEW BEDFORD RGNL		70.96W	62		_					70.1	75.8	83.7	74.4	_				-		-			5833	570		
WTHMURTRAL         4110         73	UTHWINGMAL 41101 70.7W 148 53 99 985 73.1 844 716 82.0 697 58 841 744 813 732 132 132 133 732 1197 73 73 1197 613 918 72.2 1197 73 157 870 1151 761 53 99 177 656 557 712 847 707 668 758 854 748 813 723 1197 757 73 1197 753 817 723 817 723 817 723 817 723 740 817 723 758 701 1151 761 53 229 197 676 55 758 701 1151 761 559 229 197 676 55 758 701 1151 761 559 229 197 676 55 758 710 758 751 751 751 751 751 751 751 751 751 751	UTHWINGRAL 41101 70.7W H8 53 99 985 731 844 716 820 697 58 841 744 813 732 133 732 133 732 1197 73 733 193 734 733 88 734 195 615 145 882 53 193 615 145 882 53 193 615 145 882 53 194 185 615 195 615 195 615 195 615 195 75 817 723 817 723 817 723 817 723 794 115 761 259 229 197 676 5516 4100 MALARP 42.1N 830W 627 52 31 994 738 877 723 847 707 66 88 749 813 732 73 17 112 778 701 1151 761 259 229 197 676 561 717 112 115 718 701 1151 718 711 115 718 701 1151 716 1 259 229 197 676 561 717 112 115 718 701 1151 718 711 115 718 701 1151 761 259 229 197 676 561 717 112 115 718 701 1151 718 711 115 718 701 1151 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 711 115 718 718 718 718 718 718 718 718 718 718	VOR WOOD MEM		71.17W	49							70.8	76.5	85.6	74.9							-			6233	581		
WEYMOUTH MAS 12.15 N 095 W 161 59 104 912 73.8 877 72.3 847 70.1 769 868 749 838 74.1 1279 819 72.1 197 794 135 165 145 832 735 877 72 847 71.2 810 697 80.7 881 74.0 817 72.3 794 71.7 1215 77.8 70.1 115.1 761 259 2.9 797 6706 750 751 752 791 751 792 751 752 791 751 792 751 751 751 751 751 751 751 751 751 751	WEYMOUTH MAS 42.15N 7093W 161 59 104 912 738 877 723 847 70.7 769 868 749 838 741 1279 819 722 1197 794 18.5 165 145 582 758 701 1151 761 259 259 197 6706 758 701 1151 761 259 259 197 6706 758 711 7215 778 701 1151 761 259 259 197 6706 758 711 7215 778 701 1151 761 259 259 751 758 771 1896 761 758 751 758 751 758 751 758 751 751 751 751 751 751 751 751 751 751	WEYMOUTH MAS 215N 7093W 161 59 674 912 738 877 723 847 701 769 868 749 838 741 1275 919 7701 1151 761 135 661 259 229 971 6706 258 747 712 810 711 712 758 711 7121 758 711 1215 758 712 812 814 1171 1214 759 758 712 812 814 714 821 772 756 858 714 829 717 858 718 858 717 858 718 858 717 858 718 758 853 714 826 713 858 712 853 718 858 717 858 718 758 853 714 826 713 828 712 825 718 823 718 858 717 858 718 758 853 714 826 713 828 717 858 718 758 851 778 851 778 851 778 850 778 712 1204 793 247 718 716 759 811 74 821 722 706 209 186 167 8644 148 717 822 753 1558 811 734 1752 756 209 186 167 8644 148 717 822 753 1558 811 734 1752 756 209 184 714 822 753 1558 811 734 1272 796 209 186 167 8644 148 717 822 753 1558 811 734 1272 796 209 186 167 8644 148 717 822 753 1558 811 734 122 719 90 172 1223 793 120 100 172 823 712 822 713 1238 718 734 718 718 718 718 718 718 718 718 718 718	LYMOUTH MUNICIPAL		70.73W	148							6.69	75.8	84.1	74.4							-			6154	553		
STER REGIONAL ARPT         42.27N         71.88         101         19         6.7         85.7         71.2         83.0         69.7         80.7         68.1         74.0         81.7         72.3         79.4         11.7         121.5         77.8         70.1         151.7         76.1         25.9         29.9         71.5         95.9         71.7         121.5         77.8         70.1         151.7         76.1         25.9         29.9         71.7         25.3         26.8         73.4         88.2         72.1         85.8         74.4         83.8         73.2         150.8         179.1         250.9         29.7         51.6         41.000001           ITCITY         42.41N         83.01W         627         52.9         39.7         71.1         750.8         83.4         71.2         150.8         83.6         72.2         83.9         73.1         150.8         83.7         72.9         141.8         85.7         71.1         750.8         83.4         71.1         150.7         80.2         23.17         80.9         73.1         83.9         73.1         120.7         80.2         23.1         131.7         80.9         131.7         130.9         131.8         131.	STER REGIONAL ARPT         42.27N         71.8 wm         107         12         83.0         697         80.7         81.7         72.3         79.4         11.7         121.5         77.8         70.1         115.1         76.1         25.9         29.9         73.1ms. Atmose           IT CITY         42.4N         83.0 W         627         52         96         90.7         73.4         88.2         72.1         85.8         74.8         87.3         23.6         81.9         71.9         120.5         80.3         20.4         85.3         74.8         87.3         75.3         120.1         20.6         153.1ms. Atmose	STER REGIONAL ARPT       4.2.77       7.1.8       word       6.7       8.5.7       7.1.2       8.3.0       6.7       8.1.7       7.2.3       7.9.4       7.1.7       1.2.1.5       7.8       7.0.1       1.5.1       7.6.1       2.5       2.9.2       9.5       5.5.8.3       1.1.2       8.3.0       6.7       8.3.7       7.2.3       7.9.4       7.1.7       1.2.1.5       7.8       7.0.1       1.5.1       7.6.1       2.5.3       2.9.3       9.3.3       5.3.8.3       4.4.8       7.1.1       9.98       9.99       9.93       9.5.3       7.3.1       2.3.8       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       2.3.1       3.3.1	SOUTH WEYMOUTH NAS		70.93W	161			2				70.7	76.9	86.8	74.9	-	_								5832	646		
TCITY         12 stores with the state of the state	TCITY         42.1N         83.01W         627         52         96         907         73.4         88.2         72.1         85.3         73.4         83.8         73.2         126.3         81.9         71.9         120.5         80.3         13.8         73.1         53.6         54.4         60.4         75.4         83.4         73.8         73.2         126.3         81.9         71.9         120.5         80.3         13.8         73.1         73.6         54.4         60.0         73.4         83.7         73.1         73.8         73.2         13.9         13.7         13.9         23.7         13.9         23.7         13.9         61.0         73.1         73.0         61.0         73.8         73.2         13.9         73.8         73.2         13.9         73.8         73.2         13.9         73.8         73.2         13.0         61.0         73.7         80.0         73.7         83.7         73.8         73.2         73.8         73.1         73.6         73.1         73.8         73.1         73.1         73.1         73.1         73.1         73.1         73.1         73.0         73.1         73.0         73.1         73.1         73.0         73.1         <	TICITY 1241N 8301W 627 52 96 997 734 882 721 855 708 764 864 746 838 732 1263 819 719 1205 803 04 85 751 5400 4700 000 100 100 100 100 100 100 100 100	WORCESTER REGIONAL ARPT		71.88W	1017			-				68.1	74.0	81.7	72.3		-								6706	462		
4221N 83.0W 637       52       9.0       72.1       85.4       74.6       83.4       73.2       12.0       80.3       3.0       13.0       80.4       15.1       15.0       15.0       80.3       15.1       15.0       80.3       15.0       80.4       15.1       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.1       15.0       80.3       15.1       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.1       150.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.3       15.0       80.0       15.0       80.0       15.0       80.0       15.0 <td>4221N 83.0W       627       52       96       90.7       734       88.7       71.1       86.4       74.6       83.8       73.2       126.3       81.9       71.1       120.9       909         42.22N 83.3W       15       0.93       74.8       87.8       73.1       75.8       57.3       12.27       80.2       24.7       15.9       90       94.4       90.4       73.8       87.7       25.8       82.3       73.8       17.8       12.9       80.3       24.9       81.9       71.1       120.9       80.1       24.7       15.9       19.0       64.15       90.9       44.8       90.3       74.8       87.8       75.8       15.8       15.8       15.7       12.2       80.2       24.7       19.0       64.15       90.9       44.15       90.9       94.7       10.9       96.7       96.7       97.8       35.7       74.8       85.0       73.2       12.9       10.0       24.7       10.9       96.7       94.7       71.7       85.8       73.3       12.7       12.9       10.9       64.15       64.15       85.7       73.3       12.7       13.9       14.7       11.7       10.9       86.7       14.8       85.7       73.</td> <td>421N 83.0W       67       52       83.0       71.1       56.4       74.6       83.4       73.2       12.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       100       87.7       11.1       10.6       86.4       76.8       83.4       73.8       17.8       120.7       88.9       120.7       88.9       120.7       80.2       14.7       11.1       10.6       86.4       76.8       83.4       73.8       127.3       81.3       71.1       10.9       86.4       76.8       83.4       73.8       120.7       80.2       13.8       81.0       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.1       81.9       71.8       81.9       71.1       81.9       71.7       81.9       71.7       81.9       71.7       81.9       71.1       81.</td> <td>chigan</td> <td></td> <td>-</td> <td></td> <td>-</td> <td>s, 44 more</td> <td>on CD-</td>	4221N 83.0W       627       52       96       90.7       734       88.7       71.1       86.4       74.6       83.8       73.2       126.3       81.9       71.1       120.9       909         42.22N 83.3W       15       0.93       74.8       87.8       73.1       75.8       57.3       12.27       80.2       24.7       15.9       90       94.4       90.4       73.8       87.7       25.8       82.3       73.8       17.8       12.9       80.3       24.9       81.9       71.1       120.9       80.1       24.7       15.9       19.0       64.15       90.9       44.8       90.3       74.8       87.8       75.8       15.8       15.8       15.7       12.2       80.2       24.7       19.0       64.15       90.9       44.15       90.9       94.7       10.9       96.7       96.7       97.8       35.7       74.8       85.0       73.2       12.9       10.0       24.7       10.9       96.7       94.7       71.7       85.8       73.3       12.7       12.9       10.9       64.15       64.15       85.7       73.3       12.7       13.9       14.7       11.7       10.9       86.7       14.8       85.7       73.	421N 83.0W       67       52       83.0       71.1       56.4       74.6       83.4       73.2       12.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       30.4       15.7       150.5       80.2       100       87.7       11.1       10.6       86.4       76.8       83.4       73.8       17.8       120.7       88.9       120.7       88.9       120.7       80.2       14.7       11.1       10.6       86.4       76.8       83.4       73.8       127.3       81.3       71.1       10.9       86.4       76.8       83.4       73.8       120.7       80.2       13.8       81.0       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.8       81.9       71.1       81.9       71.8       81.9       71.1       81.9       71.7       81.9       71.7       81.9       71.7       81.9       71.1       81.	chigan																				-		-	s, 44 more	on CD-		
42.2N 83.3W 663 29 80 904 738 876 726 847 71.1 769 864 750 834 738 1292 82.3 72.3 12.7 80.2 253 22.2 95 6103 42.2.4 82.9 73.3 12.2.4 80.3 73 12.3 22 93 613 74 12.4 929 73.3 12.4 920 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73.4 93 73 73 94 94 94 94 94 94 94 94 94 94 94 94 94	4224N 853.53W 163       28       53       903       74.8       87.8       73.8       153       122       80.2       37.3       12.3       12.9       610       145         4224N 853.5W 163       28       53       9.3       74.8       87.8       75.8       85.7       74.8       85.6       75.8       85.7       74.8       85.6       75.8       85.7       74.8       85.6       75.8       85.7       74.8       85.7       75.8       85.7       74.8       85.7       75.8       85.7       74.8       85.7       75.8       85.7       74.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       72.8       85.7       73.8       85.7       75.8       85.7       75.8       15.8       81.9       77.1       10.9       86.6       67.8       84.7       75.8       85.7       75.8       15.8       81.1       77.7       10.9       85.7       75.8       15.7       81.8<	42.22N 83.53W 163       29       80       90.3       74.88       72.6       84.7       71.1       76       86.4       75.0       83.4       73.8       127.8       12.3       22.3       22.3       22.3       22.3       92.3       94.9       94.9       94.9       94.9       147       21.5       99       6445         42.24N 83.53W 156       0.8       6.3       89.3       73.6       73.3       127.3       81.3       72.2       12.5       90       6445         42.20N 83.53W 76       0.3       6.3       8.9.7       74.8       87.9       73.3       127.3       81.3       71.7       120.4       73.3       24.4       85.6       71.7       120.9       96.15       6415         42.20N 83.7W 768       0.2       4.5       89.7       7.2       85.3       74.4       82.6       75.3       12.4       83.6       72.8       13.8       10.90       6615       6615       6615       6614       6415       6415       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       6416       <	DETROIT CITY	42.41N	83.01W	627							70.8	76.4	86.4	74.6	-	-		6,0	-		_			5989	884		
422N4 85.5W 78 9 02 45 8 903 740 878 57 720 839 703 767 86.5 748 829 733 1273 81.5 722 80.9 127 1204 793 124 715 1204 793 124 794 124 124 794 124 124 124 124 124 794 124 124 124 124 124 124 124 124 124 12	429N 855W 768 402 45 897 738 867 720 839 703 767 867 758 757 753 1273 813 722 122 804 127 1247 215 190 6415 429 135 127 804 129 641 1204 758 147 1204 758 145 1204 758 154 129 641 1204 758 1552 145 154 125 804 125 156 156 156 124 125 158 156 124 125 156 156 156 124 125 158 156 124 125 156 156 156 156 156 156 156 156 155 174 126 75 155 158 151 124 172 104 753 124 75 156 158 11 71 11 102 887 732 855 712 855 713 759 845 720 855 714 825 753 158 11 714 1204 753 128 710 190 665 864 425 125 800 172 102 87 73 124 857 720 855 713 759 158 11 714 127 796 209 186 167 864 427 1208 743 124 750 150 1884 753 750 125 750 155 881 11 714 127 796 209 186 166 75 864 427 1208 850 742 855 720 853 703 750 853 703 754 125 750	429N 83:5W 78       73       23       93       73       127       84       73       127       84       73       127       84       73       127       84       73       127       84       73       127       84       73       127       84       73       127       84       73       127       84       73       127       84       73       127       93       73       147       13       96       741       747       74       857       720       83       74       826       73       73       85       74       826       73       753       158       81       74       826       74       75       158       81       74       826       74       826       73       753       158       81       74       127       79       565       547       216       90       615       615       615       615       615       615       615       615       615       614       74       82       73       156       81       71       120       93       710       190       615       615       615       614       714       82       714       82       716       82	DETROIT/METROPOLITA	42.22N	83.35W	663							1.17	76.9	86.4	75.0					-		-			6103	208		
420N 83.75W 768 4-02 4-5 897 7-38 86.7 71.7 83.8 70.1 76.5 85.5 74.4 82.6 75.4 182.9 71.204 79.5 12.8 20.4 185 6741 85.6 71.7 128 87.5 74 82.6 75.4 128 121.0 79.1 3-17 120 19.0 6655 42.0 12.8 80.4 72.8 81.7 72 85.9 75.8 25.7 71.8 83.7 71.2 85.9 75.8 26.7 75.8 81.7 72 85.9 75.8 26.7 75.8 81.7 72 85.9 75.8 85.7 74.8 77.9 84.5 75.4 182.6 75.4 182.6 75.4 192.0 75.4 17.8 120.7 95.1 3-17 10.0 10.0 6655 42.0 12.8 8.7 73 2.8 25.7 71.7 83.8 70.1 75.8 45.7 71.8 25.7 75.8 11.7 1.1 12.1 79.1 79.1 92.0 12.0 16.5 42.7 44.8 25.7 75.1 75.1 12.1 10.2 89.7 74.2 85.9 75.8 25.7 75.1 85.0 10.0 89.7 72.0 10.1 88.7 73 85.7 71.9 85.7 71.9 82.7 70.1 75.0 89.7 72.0 12.7 95.1 22.7 95.1 25.7 95.1 25.7 95.1 10.2 85.4 42.2 84.4 42.2 74.4 82.7 75.1 75.1 122 87.9 10.2 85.7 122 85.7 75.8 12.4 72.7 84.4 10.0 10.6 5.5 4.8 83.7 74.2 75.0 25.0 85.7 75.1 75.2 12.2 79.9 20.9 18.6 167 5804 42.7 42.2 74.8 25.7 75.1 75.1 122 87.9 10.2 85.7 122 85.7 75.8 12.7 95.0 10.8 84.7 74.8 25.7 75.1 75.1 122 85.7 10.2 85.7 122 85.7 124 82.7 75.0 10.1 86.4 74.8 74.8 74.8 74.8 74.8 74.8 74.8 74	422NV 83.55W 768 4-02 4-5 897 738 867 720 839 703 163 853 744 82.9 733 1274 819 717 1204 793 238 204 1918 674 1458 674 1458 674 1458 674 1458 674 1458 674 1458 674 1458 674 1458 674 1458 674 1458 1458 1458 1458 1458 1458 1458 145	420N 8375W 684 42 45 897 732 855 717 828 701 763 855 744 826 754 182 971 718 1210 793 134 718 196 665 474 128 8184 754 128 874 128 814 758 856 717 858 717 858 712 859 755 855 717 858 701 765 855 714 826 754 182 6754 182 771 102 979 547 712 896 665 470 428 814 758 112 102 973 545 712 996 665 470 428 814 758 814 758 121 926 754 158 757 758 856 754 128 759 754 128 759 756 754 128 757 758 856 754 128 759 754 128 759 755 758 751 751 750 756 754 158 757 751 759 756 754 158 757 751 751 756 756 754 158 757 758 756 754 158 757 758 758 758 758 758 758 758 758 7	WILLOW RUN	42.24N	83.53W	715		_					70.8	76.7	86.3	74.8							-			6415	619		
42888 85.52W 884 22 69 894 73.1 865 71.7 8.38 701 76.3 85.1 744 82.6 73.4 128.2 81.4 71.8 1210 79.3 24.7 210 190 66.5 42.10 83.17W 99 7.1 10.2 89.7 74.2 89.9 73.5 82.5 71.8 779 84.5 76.2 82.7 75.3 1358 81.1 73.4 1272 79.6 20.9 18.6 16.7 5804 42.758 86.10W 89 72 10.1 884 73.3 85.7 72.8 82.3 70.3 76.1 84.2 74.8 22.7 73 1358 81.1 73.4 1272 79.5 20.9 18.6 16.7 5804 42.268 44.0 10.0 10.5 5.4 183 73.4 85.7 710.1 76.0 84.4 73.8 72.2 122.3 79.5 12.1 192 62.9 42.264 42.268 45.7 13.8 22.7 172 122.3 79.5 12.1 192 62.9 42.04 42.0 10.0 10.5 5.4 183 73.4 85.7 710.1 76.0 84.4 73.8 22.7 73.1 122 779 122.7 79.5 12.1 192 62.9 42.268 45.0 10.8 10.7 10.1 10.0 10.5 5.4 183 73.4 85.7 70.1 76.0 84.4 73.8 22.7 73.1 75.0 122 779 79.5 12.1 192 62.9 42.0 10.8 10.7 10.0 10.5 5.4 183 73.4 85.7 70.1 76.0 84.4 73.8 82.7 73.7 75.7 122 79.5 12.2 79.5 12.1 192 62.9 42.0 44.0 10.0 10.5 5.4 183 73.4 85.7 70.1 76.0 84.4 73.8 82.7 73.7 75.7 75.7 75.7 75.7 75.7 75.7 75	428N 85.52W 894 22 69 894 73.1 865 73.7 838 70.1 763 85.7 744 82.6 734 135 814 718 1210 79 14.7 2190 66.5 42.0 82.7 12.0 89 74.7 20 190 66.5 42.7 12.0 89 74.7 20 190 66.5 42.7 12.0 89 74.7 20 190 66.5 42.7 12.0 89 74.7 10 10.2 884 73.8 55 72.0 82.3 75 184.2 74.8 22 75.1 15.0 80 72.2 122.7 76 20 86 167 884 42.7 82.0 86 10 42.0 88 17 2.1 10.2 884 73.8 57 72.0 82.3 70.1 76 844 74.8 82 75.1 15.0 80 72.2 122.7 79 20 20 42.0 42.0 84.8 71.8 81.7 71.8 839 70.1 76 0.8 44 74.8 82 75.1 15.0 80 72.2 122.7 192 624 42.0 84.7 84.8 71 71.8 839 70.1 75 0.8 44 74.8 82 75.1 15.0 80 72.2 122.7 192 624 42.0 84.8 71.8 81.0 72 81.7 11.8 10.0 10.0 10.0 10.0 10.0 10.0 10.0	42888         85.52W         89.4         22         6.9         89.4         7.1         83.8         7.1         83.8         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.6         7.1         83.7         7.2         83.7         7.1         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         83.7         7.2         93.6         84.6         7.2         83.7         7.2         83.7         7.2         1.2         83.7         7.2         1.2         93.7         7.2         7.2         1.2         93.7         7.2         1.2         93.7         7.2         1.2         93.7         7.2         93	TINT/BISHOP INTL	42.97N	83.75W	768		_					70.3	76.3	85.3	74.4							_		-	6741	594		
42.008 83.17W 591 7.1 102 897 742 859 735 825 718 779 845 762 827 753 1358 811 734 1272 796 209 186 167 5804 42.758 86.10W 689 72.2 101 884 733 857 720 827 701 760 844 743 822 773 1526 889 722 122 795 257 221 192 6234 42.208 444 748 827 738 86.10W 685 738 758 758 758 758 758 758 758 758 758 75	42.108 83.17W 591 7.1 10.2 897 742 859 755 825 718 779 845 762 827 755 1558 811 754 1272 796 209 86 167 5804 42.57 82.0 859 75 10.1 884 753 857 720 829 75 10.1 884 753 857 720 829 75 10.1 884 753 857 720 829 75 10.1 864 744 822 751 1250 809 718 1222 794 729 82 557 211 192 629 42.548 873 23 815 940 728 877 718 839 704 759 846 744 828 728 1559 810 720 1224 799 12.7 791 712 859 669 42.248 859 728 1559 810 720 1224 799 172 100 772 859 759 750 750 846 744 828 728 1559 810 720 1224 799 172 172 190 772 851	42.000 83.17W 991 71. 102 897 742 859 735 825 718 779 845 762 82.7 753 135 811 734 1272 796 209 186 167 5804 2723 804 829 752 122 792 823 752 122 795 521 192 6234 422 744 82.7 751 1360 809 722 1223 795 257 221 192 6234 42268 842 748 823 751 751 856 751 844 754 825 752 1223 795 257 221 192 6234 42268 842 748 825 758 846 944 748 828 753 752 1223 795 257 221 192 6234 42268 846 754 8558 857 758 856 900 728 877 718 839 704 758 846 744 828 753 151 1260 809 718 1222 794 202 8234 659 452 748 825 752 1259 92 179 102 659 758 752 1258 752 1259 758 751 854 758 856 758 856 758 856 758 856 758 856 758 857 758 856 758 857 758 857 758 856 758 857 758 856 758 857 758 856 758 857 758 856 758 857 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 758 856 850 758 857 758 758 856 758 758 856 758 856 758 856 758 856 856 758 856 758 856 758 856 856 758 856 758	<b>GRAND RAPIDS/KENT C</b>	42.88N	85.52W	804		_					70.1	76.3	85.1	74.4	_				-		_			6615	639		
42.758 86.10W 689 7.2 10.1 884 73.3 857 72.0 82.3 70.3 76.1 84.2 74.4 82.2 73.1 126.0 80.9 72.2 122.3 79.5 25.7 22.1 19.2 62.94 22.2 82.4 69.0 0.5 5.4 88.3 73.4 85.6 71.9 82.7 70.1 76.0 84.4 74.3 82.2 73.2 127.9 80.9 71.8 122.2 79.4 20.2 18.4 16.9 6619	42.758 %6.10W 689 72 10.1 884 73.3 857 72.0 823 70.3 76.1 84.2 74.4 822 73.1 126.0 80.9 72.2 12.2 79.5 257 72.1 19.2 6234 42.0 850 84.0 70.0 0.5 5.4 88.3 73.4 85.7 71.9 83.9 71.9 71.9 80.7 13.8 12.2 79.4 12.0 84.6 74.9 620 72.8 12.4 79.9 12.7 19.0 17.2 6351 72.0 12.4 79.9 12.7 19.0 17.2 6351	42.758 86.10W 689 7.2 10.1 884 73.3 857 72.0 82.3 70.3 76.1 84.2 74.4 82.2 73.1 126.0 80.9 72.2 12.2 79.5 257 22.1 19.2 62.94 42.20K 84.46W 1020 0.5 5.4 88.3 73.4 85.6 71.9 82.7 70.1 76.0 84.4 74.3 82.2 73.2 137.9 80.9 71.8 122.2 79.4 20.2 18.4 16.9 6619 42.24K 85.55W 873 2.8 86 90.0 72.8 877 71.8 83.9 70.4 75.9 84.6 74.4 82.8 72.8 125.9 81.0 72.0 122.4 79.9 21.7 19.0 172 62.9	GROSSE ILE MUNI	42.10N	83.17W	165		_					71.8	6.77	84.5	76.2	5	7					_			5804	863		
42.26N 84.46W 1020 0.5 5.4 88.3 73.4 85.6 71.9 82.7 70.1 76.0 84.4 74.3 82.2 73.2 127.9 80.9 71.8 122.2 79.4 20.2 18.4 16.9 6619	42260 84,46W 1020 0.5 5,4 88.3 73.4 85.6 71.9 82.7 70.1 76.0 84,4 74.3 82.2 73.2 127.9 80.9 71.8 122.2 79.4 20.2 18.4 16.9 6619 42.24N 85.55W 873 2.8 86 90.0 72.8 87.7 71.8 83.9 70.4 75.9 84.6 74.4 82.8 72.8 125.9 81.0 72.0 122.4 79.9 21.7 19.0 17.2 6251	42.268 84.46W 1020 0.5 5.4 88.3 73.4 85.6 719 82.7 70.1 760 84.4 74.3 82.2 73.2 1279 80.9 71.8 122.2 79.4 20.2 18.4 16.9 6619 42.24N 85.55W 873 2.8 8.6 90.0 72.8 87.7 71.8 83.9 70.4 75.9 84.6 74.4 82.8 72.8 125.9 81.0 72.0 122.4 79.9 21.7 99.0 17.2 6231	TULIP CITY	42.75N	86.10W	689		-					70.3	76.1	84.2	74.4	5						_			6234	617		
	42.24N 85.55W 873 2.8 8.6 90.0 72.8 87.7 71.8 83.9 70.4 75.9 84.6 74.4 82.8 72.8 125.9 81.0 72.0 122.4 79.9 21.7 19.0 17.2 62.51	4224N 8555W 873 2.8 8.6 90.0 72.8 877 71.8 839 70.4 75.9 84.6 74.4 82.8 72.8 125.9 81.0 72.0 122.4 79.9 21.7 19.0 172 0.251	ACKSON CO REYNOLDS	42.26N	84.46W	1020		_					70.1	76.0	84.4	74.3		8					-			619	565		

TING COIL REHEAT HEATING COIL	ENT LWT TOTAL LAT ENT LWT MBH DB	609.9 95°F 180°F 157°F	66.7 95'F 155'F	313.5 98°F 158°F	86.5 99°F 158°F	329.3 104°F 152°F	86.5 93°F 158°F	180F 160F 339.1 70F 150F	180F 150F 480.7 70F 150F	180F 160F 63.4 65F 150F	180F 150F 57.7 65F 150F		590.6 107F 155F	590.6 107F 155F	97.3 96F 160F	590.6 107F 155F	244.1 105F 155F	178.1 95°F 160°F	576.1 106F 155F	576.1 108F 155F	131.6 95F 160F	
PREHEAT HEATING COIL	AL LAT		9	3	ŝ	1	ţ.	36 70F	63 70F	45 95F	-5 95F	1	ţ.		5	3	0	1	5	1	5	
REHEAT	LAT TOTAL DB/MB MBH	•	1. 1.	- 365/2315 -		а 1	- 365/5375 -	66F/58F 1,535	66F/58F 2,263	65°F/58°F 573.5	65F/58F 573.5	a a	с	а а	66F/59F -	a a	e e	64'F/58'F -	е 1	а а	66F/59F -	
HEATPIPE REHEAT	ROWS	1	1	3 6	3	1	3 6	4	4	4	4	1	i,	1	3 6	1	i.	3 6	i.	1	3 6	
	LWT	345	SAF	54F	SAF	SAF	54F	SAF	54F	Ser	SAF	54F	SAF	54F	54F	SAF	54F	54F	54F	54F	54F	
	EWT	44°F	_																		-	
COOLING COIL	LAT DB/MB	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	55F/54F	
ľ	SENSIBLE	395.6	45.5	151.0	36.2	158.2	36.2	574.4	799.6	145.0	125.1	233.2	273.5	273.5	43.6	273.5	112.6	95.6	263.1	263.1	56.3	
	TOTAL	484.3	65.1	166.6	40.5	222.9	40.5	840.7	1,160.0	196.5	171.0	333.3	395.0	395.0	50.7	395.0	154.4	110.4	385.4	385.4	71.1	
ER	ЧP	1/20	_				-	1/2	1/2	1/20	1/20	-									-	
N	а н	3 (x2)	1.5	\$	-	7.5	-	32	40	s	5	7.5	10	10	-	10	s	5	7.5	7.5	1.5	
EDHNUST FAN	E.S.P.	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8"	0.8"	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
â	DESIGN	10,800	1,650	6,790	1,580	3,500	1,515	20,130	28,360	5,345	3,400	4,500	10,700	10,700	2,175	10,660	2,170	3,830	000'6	000'6	2.475	
	d H	7.5	2	\$	2	7.5	2	\$	99	7.5	7.5	2	5	15	2	2	\$	*	15	12	•	
r FAN	ESP.	80 1.3	0 1.5	0 1.3	5 1.5	0 1.5	5 1.5	30 1.3	60 1.3	0 1.5	0 1.5	0 1.3	00 1.5	00 1.3	5 1.3	60 1.3	0 1.5	0 1.5	0 1.5	0 1.5	5 1.5	
SUPPLY FAN	S N N	00 11,780	0 1.700	0 6,990	5 1,655	0 3,500	5 1,535	3 20,130	55 28,360	0 5,570	0 4,700	0 4,500	00 10,700	00,700	5 2,295	50 10,660	0 2,170	0 4,050	0 9,480	0 9,480	5 2,925	
L	ER DESIGN	F 12,100	F 1,700	6,990	1,655	F 6,000	1,535	F 20,393	F 28,655	5,570	4,700	8,480	F 10,700	F 10,700	2,295	F 10,660	F 4,420	F 4,050	9,480	9,480	5,925	
WHEEL LAT	R WINTER B. D.B.	FF 55F	FF 49F	5F 57F	5F 57F	FF 54F	SF 58F	FF 56F	FF 55F	S4F	F SAF	5F 54F	5F 53F	SF 53F	5F 53F	rF 53F	5F 55F	FF 54F	FF 52F	FF 52F	FF 54F	
AT	SUR D.B	79F/67F	80F/67F	79F/66F	79F/66F	79F/67F	785/655	80F/67F	80F/67F	785/655	78F/65F	79F/66F	79F/66F	79F/66F	79F/66F	80F/67F	795/665	79F/67F	791676	79F/67F	791675	
EXHAUST &	WINTER D.B.	TOF	-																		-	
DESIGN EXHAUST ENT. AIR TEMP.	SUMMER D.B./W.B.	76F/67F	_																		-	
JISOE	WINTER D.B.	1115	_																		-	
DESIGN OUTSIDE ENT. AIR TEMP.	SUMMER WINTER D.B./W.B. D.B.	391/316	_																		-	
	SWBOL	ERU-1	ERU-2A/B	ERU-3	ERU-4	ERU-5	ERU-6	ERU-7	ERU-8	ERU-9	ERU-10	ERU-11	ERU-12	ERU-13	ERU-14	ERU-15	ERU-16	ERU-17	ERU-18	ERU-19	ERU-20	

Energy Recovery Unit schedule.