7810000 – ITS MOTORIST INFORMATION SYSTEMS – ROAD WEATHER INFORMATION SYSTEM
COMMENTS/RESPONSES FROM INDUSTRY REVIEW

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Missy Hollis
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Comments:
Pay items:
To be consistent with other sections, please do not list the "B" options of the pay item structure- just limit the item to 781- 1- ITS Dynamic Message Sign, Each.

ITS Section Response: Comment accepted and incorporated into the document.

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Karen Byram
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Comments:
This type of product was listed on the QPL under section 102. Given the technical requirements, shouldn't this product be also be required to be preapproved by Traffic Operations or other office and listed on the APL or QPL?

ITS Section Response: While Section 102 addresses portable HAR installations, the Traffic Engineering and Operations Office's ITS Section conducts testing on permanent, fixed-mount HAR systems and other motorist alert tools covered in Section 781. These systems are evaluated at the Traffic Engineering Research Lab and listed on the Approved Product List, according to the requirements of Section 780.

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Bob Dion
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Comments:
781-1:The specific requirements for each system are in 781-3 through 781-5. Suggest deleting 'and' after 781-2, replace it with a ","; change 781-6 to 781-5 adding ', and the Guaranty provisions of 781-6 …….'

The 5th paragraph of 781-3.1.5 refers to Section 785-1. Delete Section you are referring to an article number. Should this 781-1 instead of 781-2? 785-1 deals with grounding and surge protection; 785-2 deals with 'pole and lowering device'.

ITS Section Response: Comment accepted and incorporated into the document. The opening text was edited for clarity and to reflect the renumbering that occurs after the revision and addition of new language. All references to other sections are double-checked prior to publication. The reference to grounding and surge suppression is now 785-2, due to renumbering

of sections in that chapter.

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Chris Birosak
D1 ITS Program Manager, (863) 519-2507

Comments:
I suggest adding language for the addition of a generator transfer switch to be provided with the DMS cabinet. To provide for automatic transition from generator power back to utility power after utility power is restored, an automatic transfer switch should be used. If a generator transfer switch is not part of the original manufacture and installation it will have to be retrofitted to the cabinet after installation.

ITS Section Response: Comment noted. Document not changed. As stated in Subsection 781-3.1.10, DMS cabinets must meet the requirements of 785-4, ITS Field Cabinets. In Subsection 785-4.2.9.6, Generator and Auxiliary Power Connection, it states that if shown on the plans, the field cabinet is to be furnished with provisions for the connection of an external power source, such as a portable generator, through a weatherproof, water-resistant, secure interface. The cabinet is also to be provided with a manual transfer switch rated for the design load of the cabinet's main breaker to provide an alternate power source using a generator. Leaving this feature to the designer to include in the plans on a site-by-site basis permits some flexibility in situations where a District may not want a transfer switch at every sign location.

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Dr. Patrick T. Welsh
Advanced Weather Information Systems Laboratory
University of North Florida
Jacksonville, FL 32224

Comments:

While most of the changes are relatively minor and/or sound, there is a philosophical issue that needs to be considered in the RWIS that is precluded in Specification 7850000, and that is, I believe, an integral part of the Florida RWIS requirement.

The requirement for an emergency facility or individually-mounted and solar powered system is not excluded from this specification, and part of the unique designs we implemented in the RWIS test facility and the Florida project demonstrated the utility of a stand alone portable solar-powered unit. For instance, our implementation of the Hurricane Evacuation Bridge Wind Sensors would not meet these requirements, and probably should not be grounded at all, as that only increases the probability of a direct lightning strike. Our lightning survival rates are higher from the ungrounded systems (on the highest points of the evacuation bridges) exceeds those of the original test facility sites.

This specification while reasonably safe for large installations, virtually precludes the small solar power remote sites that may be required for Emergency Response (Wildfire and other Incident

Command response scenarios), situation specific sensors such as a single sensor requirement on a bridge (or other constrained area) which would telemeter back to a larger base site, and the ability to remove the wind and temperature sensors from the direct road influences. This will surely impact the number of sites and information flow available from the future RWIS VII program to only those sites near power and infrastructure, where we generally already have direct measure of many of the VII parameters or proxy estimates. The power of VII as part of the RWIS/ITS is in its ability to infer conditions in remote areas from vehicle data.

Recommendation: A specific sentence or clause in Section 785-1 that excludes remote solar-powered and single sensor telemetry sites from this requirement, if approved by the DOT project engineer and the Regional headquarters.

I believe this change will enable use of the newer technologically advanced systems to continue to play a role in the RWIS and ITS arena.

ITS Section Response: Comment noted. Document not changed. You are correct that the RWIS requirements cover a fixed, permanent sensor station with multiple instruments attached. The specification addresses only the devices mounted along state roads and interacting with FDOT systems and traffic operations. Battery- and solar-powered sensor stations are allowed, and we would hope that the instrument(s) utilized in these emergency deployments perform to the level stated in this RWIS specification. In addition, there are means whereby the Department is able to accept and authorize the temporary use of new or innovative devices. See Section 603-2 of the FDOT Standard Specifications for Road and Bridge Construction.

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Chris R. Birosak
ITS Program Manager
District One, Florida Department of Transportation
Phone (863) 519-2507
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Comments:

I suggest adding language for the addition of a generator transfer switch to be provided with the DMS cabinet. To provide for automatic transition from generator power back to utility power after utility power is restored, an automatic transfer switch should be used. If a generator transfer switch is not part of the original manufacture and installation it will have to be retrofitted to the cabinet after installation.

ITS Section Response: [duplicate of above comment].

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Dr. Pat Welsh
Executive Director
Advanced Weather Information Systems Laboratory
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Comments:

The National Weather Service Instructions for weather site selection and sensors are attached (also available online).

[Attachments: National Weather Service Instruction 10-1302, Oct. 17, 2003 – "Instrument Requirements and Standards for the NWS Surface Observing Programs (Land)"; National Weather Service Instruction 10-1312, Feb. 11, 2005 – "Complementary Data Sources and Networks"]

Recommendation: Recommend they be referenced in appropriate section(s).

ITS Section Response: Comment noted. Document not changed. We examined NWSI 10-1302, which was revised in October 2005. We have chosen to stay with the original values in the draft RWIS specification, which in some cases are more stringent for certain devices.

I have become aware of very recent specifications by ASTM for weather sensors and recommend they be directly referenced in your Specification section 781-5.2.1 on sensors and performance (781-5.2.2).

We have been able to track down the following ASTM items:

ASTM for wind measurement ASTM D5741 11010-1
ANSI website has also ISO 16622:2002 defines test methods of the performance of sonic anemometers/thermometers.

ITS Section Response: Comment noted. Document not changed. Actually, the pertinent ASTM standard is D6011-96 (2003), which gives a method for determining the dynamic performance of a sonic anemometer or thermometer employing the inverse time measurement technique for velocity or speed of sound, or both. This standard is most likely to be utilized as an instrument evaluation tool at TERL when RWIS testing is begun.

ASTM D6176-97R03 Practice for Measuring Surface Atmospheric Temperature with Electrical Resistance Temperature Sensors

ITS Section Response: Comment noted. Document not changed. The ASTM has advised us that this is a standard for how to make a valid temperature reading. It is a procedure, not an equipment requirement.

ASTM D3631-99(2004) Covers the measurement of atmospheric pressure with two types of barometers: the Fortin-type mercurial barometer and the aneroid barometer.

Pat's note: Mercurial barometers are seldom used due to HAZMAT problems.

ITS Section Response: Comment noted. Document not changed. The ASTM has advised us that this is a standard for how to make a valid barometric pressure reading. It is a procedure, not an equipment requirement.

ASTM D1356-05 Standard Terminology Relating to Sampling and Analysis of Atmospheres. ASTM International

ITS Section Response: Comment noted. Document not changed. According to the ASTM, this is a standard covering weather sampling methods. It does not give equipment requirements.

ASTM E337-02 Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures) ASTM International 10-Oct-2002

ITS Section Response: Comment noted. Document not changed. According to the ASTM, this is a standard that describes how to make a valid measurement with a psychrometer and then convert the wet-bulb and dry-bulb readings to relative humidity. It does not give equipment requirements.

ASTM D1357-95(2005) Standard Practice for Planning the Sampling of the Ambient Atmosphere. ASTM International

Recommendation: Reference the ASTM standards rather than specifying the details.

ITS Section Response: Comment noted. Document not changed. While we agree that standard sampling practices are essential, the scope of these FDOT specifications is limited to the material requirements for the devices.

The NWS standard for wind equipment is 33 feet (10 meters). According to NWSLI 10-1302 (attached), Appendix E "Siting and Exposure Standards for NWS Climate Observing Program", 4b: "The standard height above the ground for wind sensors is 33 feet. If local restrictions prevent installing the sensors at the 33-foot standard, install them no less than 20 feet above the ground."

ITS Section Response: Comment accepted and incorporated into the document. The text was changed to state that an anemometer will be installed at no less than 20 feet above the ground.

Also From Mike McAllister of the National Weather Service:

“"781-5.2.9 Foundation and Tower Specifications: Provide a supporting tower or pole that provides a mounting platform for atmospheric sensors free of influences from topography, buildings, and vehicles. Ensure that the tower also supports any lightning protection devices (e.g., grounding rods) for the site. Mount the atmospheric sensors on a hinged, 20- to 30-foot [6.1- to 9.1-meter] tower." I didn't see anything spelled out for "free of influences from topography, buildings, and vehicles." If that is left subject to the installer's interpretation, you might indeed end up measuring wake turbulence from 18 wheelers.

ITS Section Response: Comment noted. Document not changed. In the ESS siting information we are including in the FDOT Plans Preparation Manual, we are citing the FHWA's Road Weather Information System Environmental Sensor Station Siting Guidelines, Publication No. FHWA-HOP-05-026 (April 2005). This document specifically addresses the siting issues unique to roadside data collection and alleviates the need for an installer's best guess about sensor placement. We have also incorporated a minimum mounting height of 20 feet for anemometers.

For wind, the 30 foot tower would be good, in line with what is used at airports for wind equipment (30 to 33 feet). Using the NERON standards; the wind tower should be located at a distance of at least 10 times the height of the nearest obstruction, an obstacle must be below a height of 18 feet within a 500 foot radius and below 23 feet within a 1000 foot radius. This is similar to what is found in the "Federal Standard for Siting Meteorological Sensors at Airports", section 2.5. It states that the wind sensor shall not exceed 33 feet except to be at least 15 feet above any obstruction within a 500 foot radius, and be at least 10 feet higher than any obstruction within a 500 - 1000 foot radius of the sensor. "An object is considered to be an obstruction if the included lateral angle from the sensor to the ends of the object is 10 degrees or more."

ITS Section Response: Comment noted. Document not changed. In the ESS siting information we are including in the FDOT Plans Preparation Manual, we cite the FHWA's Road Weather Information System Environmental Sensor Station Siting Guidelines, Publication No. FHWA-HOP-05-026 (April 2005). This document specifically addresses the siting issues unique to roadside data collection and covers the precautions necessary due to obstructions, interference from passing vehicles, use of right-of-way space, and other concerns. This guidance document is the FHWA's effort to strike a balance between road-specific weather information requirements and the criteria in National Weather Service Instruction 10-1302, Oct. 4, 2005. FHWA guidance calls for the same mounting heights and buffer distances that you refer to in NWS publications.

For climate purposes, we like to have the temperature sensor at least 100 feet away from any paved or concrete surface, and no closer than four times the estimated height of any obstruction (tree, fence, building, etc.). Height of the sensor is around 5 feet (RWIS will be at 10 feet; 781-5.4). The rain gauge should not be close to isolated obstructions such as trees and buildings which may deflect precip due to erratic turbulence. The general rule is the gauge's distance from a potential obstruction should be at least twice the estimated height of the obstruction. Reference: NWSM 10-1315. Also we mount our gauges at or near the surface with the top of the gauge about 3 feet above the ground.

ITS Section Response: Comment noted. Document not changed. In the ESS siting information we are including in the FDOT Plans Preparation Manual, we are citing the FHWA's Road Weather Information System Environmental Sensor Station Siting Guidelines, Publication No. FHWA-HOP-05-026 (April 2005). This document specifically addresses the siting issues unique to roadside data collection and covers the precautions necessary due to obstructions, interference from passing vehicles, use of right-of-way space, and other concerns. This guidance calls for the same mounting heights and buffer distances that you refer to in NWS publications.

Can FL DOT meet these exposure standards? I doubt it (right-of-way, eminent domain issues,

needed proximity to pavement sensors, etc). But if standards are needed, these are what we aim for. It would make things simpler for all data users if we were at or near the same levels in exposure and instrumentation - especially for incorporating the data into the Florida mesonet. You may want to research the FAWN standards and see how they compare to the NWS.

ITS Section Response: Comment noted. You are correct about the restrictions of the roadside environment. Through a combination of FHWA guidance and good project design, we intend for RWIS deployments to be a reliable source of information for highway users.

NWR... If DOT wants to alarm for a particular area, i.e. a few miles near the low power (10 watt) HAR transmitter, then Specific Area Message Encoding (SAME) would be preferred. Likewise if they want to catch all the HazCollect alarms. Otherwise a generic NWR would work that would alarm for a multi-county broadcast area.

ITS Section Response: Comment noted. Document not changed. It is our intention that the FDOT SunGuide software handle the RWIS alarm function, notifying the TMC operator of any hazardous weather conditions.

Finally...The University of North Florida's Advanced Weather Information Systems Laboratory would be glad to consult with you and the National Weather Service offices in Florida (as well as FHWA) on the RWIS specification(s) and CLARUS interoperability and compatibility. We judge our experience with the two completed RWIS projects and the National CLARUS CONOPS team would be of considerable value in the process.

ITS Section Response: Comment noted.

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