

## 6.0 Groundwater, Stormwater, Water Supply, and Wastewater

---

## **6.0 GROUNDWATER, STORMWATER, WATER SUPPLY & WASTEWATER**

---

### **6.1 Groundwater**

#### ***6.1.1 Existing Conditions***

The island of Nantucket is underlain by an EPA designated sole source aquifer. A sole source aquifer is defined as the source of 50 percent or more of the drinking water for a given area for which there are no reasonably available alternative sources should the aquifer become contaminated. In addition to being located over a sole source aquifer, the airport is located immediately southeast of the Zone II for the municipal wells operated by the Wannacomet Water Company. A Zone II is defined by DEP as the “area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation).”

##### **6.1.1.1 Topography and Surface Water Drainage Patterns**

Topography in the vicinity of the airport is relatively flat, with elevations ranging between approximately 30 and 50 meters above sea level National Geodetic Vertical Datum (refer to the Locus Map, Figure 1-1). Elevations slope gently to the south towards the Atlantic Ocean.

According to the United States Geologic Survey topographic map of the area, there are two intermittent streams near the airport. Nobadeer Valley is located between Runway 6/24 and Runway 15/33 and flows in a south-southwesterly direction towards the ocean. Madequecham Valley is located beyond the end of Runway 33 and flows in a more southerly direction towards the ocean.

##### **6.1.1.2 Groundwater Table**

The slope of the groundwater table in the area of the airport generally mimics the slope of the topography. Wells located on the site show an elevation change of approximately ten feet in the groundwater table across the property, north to south, with the slope trending in a generally southern direction towards the ocean.

Since the issuance of the Certificate on the DEIR, the EPA has requested additional information relating to groundwater flow. Based on that request, groundwater elevation data gathered in October and November, 2002, from the monitoring wells located on airport property was modeled and plotted on a base plan created from the Town of Nantucket GIS map to establish a generalized groundwater contour map. Figure 6-1, Groundwater Flow, shows the generalized groundwater contours in the vicinity of the airport property. Flow direction at any given point can be determined by creating a southerly pointing line perpendicular to the contour line nearest to that point.

### **6.1.2 Groundwater Management Plan**

Given the necessity of maintaining the high quality of groundwater in the area, the airport has previously committed to an extensive groundwater management plan. The provisions of the management plan include:

- ◆ Ensuring that hazardous waste generators at the airport are in regulatory compliance;
- ◆ Upgrading underground fuel tanks of 1,000 or more gallons and older than 10 years;
- ◆ Storing and labeling of chemicals, waste oils, petroleum products or other hazardous materials used or stored on airport property properly;
- ◆ Developing and constructing a system to contain materials from accidental spills and deicing activities on ramps;
- ◆ Developing and updating the airport's Spill Prevention Control and Countermeasures (SPCC) Plan for the existing catch basins, and developing an airfield spill contingency plan. The Airport's new SPCC Plan was presented in Appendix C of the DEIR;
- ◆ Developing designated aircraft washing, deicing, refueling, and maintenance areas;
- ◆ Implementing the groundwater monitoring plan;
- ◆ Developing and implementing a training program; and
- ◆ Identifying cleanup methodologies.

The status of each of these groundwater protection measures was described in the DEIR.

#### **6.1.2.1 Aircraft Washing and Deicing**

As noted in Section 2.0, Project Description, one element of the proposed project is the construction of a wash pad and deicing facility to be located on existing pavement north of the terminal building. See Figure 1-3 for the location of this facility. Activities relating to aircraft washing and deicing will take place in this area only, and containment will be provided. The surface will be graded so that water and detergents or deicing chemicals will be directed to a central catch basin and stored in a tight tank. Waste water from these operations will be collected from the containment system and recycled. Collected material that is not suitable for recycling will be delivered to an appropriate disposal facility. Figure 2-1 shows a schematic of the wash pad and deicing facility along with details of drainage devices.

N



LEGEND

ACK-9 MONITORING WELL

5  
GROUNDWATER ELEVATION  
CONTOUR MSL DATUM

NOTES:

- 1. ALL PLAN FEATURES BASED UPON TOWN OF NANTUCKET GIS.
- 2. GROUNDWATER ELEVATION CONTOURS CREATED FROM WATER TABLE ELEVATION DATA COLLECTED IN OCTOBER & NOVEMBER 2002.
- 3. CONTOUR LINES CREATED WITH SURFER 7 SOFTWARE PRODUCED BY GOLDEN SOFTWARE INC.

FIGURE 6-1

	TITLE: GROUNDWATER FLOW	PRT. NO. ###
	PROJECT: GROUNDWATER FLOW DIRECTION WAMPONOAG/AIRPORT AREA NANTUCKET	DATE: 1/14/99
	CLIENT: <b>WANNACOMET WATER COMPANY</b> <small>One Milestone Road Nantucket, MA 02554</small>	BLOCKS/D-SIZE_SHEET
	SCALE:	

### **6.1.2.2 Groundwater Monitoring**

Because of the proximity of the airport to public drinking water supplies, the Wannacomet Water Company, which operates the water supply, has agreed to conduct annual monitoring of groundwater at the airport, with support from the Airport Commission. This monitoring is undertaken in accordance with EPA requirements. Results from groundwater monitoring conducted in 2001 and 2002 were presented in the DEIR.

Following sampling in 2001, in which apparently reportable levels of chloroform were detected in groundwater, the airport contacted DEP for guidance. DEP determined that the chloroform was naturally occurring and exempt from notification in accordance with 310 CMR 40.0317(20), which includes an exemption for “releases of chloroform in groundwater attributed to naturally-occurring ecological processes and/or leakage or discharge from a public water supply system.” Nevertheless, the airport continues to monitor and report chloroform levels at the airport.

In the most recent testing, samples were collected from each of the monitoring wells on the airport on December 8, 2003 and analyzed on December 18, 2003. Except for the chloroform, discussed above, no compounds tested had concentrations above reporting limits. The laboratory report and testing results are included in Appendix B.

In response to EPA’s comment letter on the DEIR, the airport has requested that the Wannacomet Water Company add the deicing chemical, propylene glycol, to the list of monitored substances in the groundwater monitoring program.

### **6.1.3 Stormwater Management**

Stormwater is generated when rainwater falls on impervious surfaces and flows overland until it collects and infiltrates into the subsoils or discharges to water bodies. Impervious surfaces, such as pavement areas, also tend to accumulate pollutants between rainfall events which are then re-mobilized when stormwater travels across those impervious surfaces.

Stormwater management is an important issue at the airport due to its large impervious area, the presence of potential pollutant generating activities, and the sensitivity of the groundwater resources that underlie the airport. This section describes the existing stormwater management system, and proposed best management practices which will ensure protection of downgradient water resources, particularly the groundwater resources.

#### **6.1.3.1 Existing Stormwater System**

Stormwater management at the airport consists of the use of catch basins, drainage lines, confined basins, dry wells, and swales to collect, transport, and infiltrate stormwater. Stormwater on the site is infiltrated to groundwater and no surface water discharge from the property occurs. Most of the existing system does not contain petroleum traps/separators.

Runways 15/33 and 6/24 are equipped with a system of catch basins and drainage lines spaced relatively close together to collect stormwater and rapidly remove it from the runway surface. Dry wells are located in the grassed infield areas between runway 6/24 and the terminal. These infield areas collect runoff from taxiways A through D as well as portions of the terminal apron, aircraft parking apron and associated roadways. Concrete pipes also convey drainage from the infield areas and adjacent lands north and east of the airport under the runways toward the west and south. Swales convey this flow as well. One confined basin is located on the western side of the airport between runway 6/24 and Taxiway D. The confined basin is equipped with a drywell to facilitate infiltration.

A concentrated system of 34 drywells collects stormwater runoff from the terminal parking area and infiltrates the associated stormwater. No expansion of the terminal parking area is proposed. In addition, a trunk line of catch basins and drainage pipes collects stormwater from the area between the terminal and the taxiways, including portions of the terminal apron and aircraft parking apron. This runoff is discharged to a drainage trench which flows to an excavated basin that traps and holds stormwater for infiltration. Figure 6-2, Drainage Plan shows the location of these facilities and Figure 2-1, Drainage Details shows the structures used for stormwater control.

#### **6.1.3.2 Best Management Practices**

The Airport Commission has committed to using oil separator catch basins in new construction areas. These areas include the new terminal building, the Runway 15/33 extension, and the jet aircraft parking apron at the Bunker Area. These structures will be maintained on a regular basis and will contribute to the protection of the Sole Source Aquifer underlying the airport. The structures will also be equipped with valves that will allow the structures to be isolated in the event of an accidental spill.

#### **6.1.3.3 Stormwater Quality**

At the request of the EPA, the Airport has agreed to collect and analyze surface water runoff from the airport's South Ramp during a "first flush" rainfall event. This water quality testing will provide information on runoff quality that will assist in detailed design of the stormwater collection and disposal system. As noted by EPA, this testing will also provide baseline information about stormwater quality on the Airport for future comparison.

## **6.2 Water and Wastewater**

### **6.2.1 Water Supply**

#### **6.2.1.1 Projected Need and Available Supply**

The Wannacomet Water Company (WWC) provides water to the airport for its potable uses. The WWC billed the airport for 1,604,250 gallons of water for the year 2003, which represents an average of 4,400 gallons per day (gpd). During July and August of 2003, the

airport reported enplanements of 35,050 and 36,458 respectively. Based on the use estimates provided by Title 5 of the State Sanitary Code at five gallons per day per passenger, the peak water use can be estimated at 175,250 gallons for July (5,650 gpd) and 182,200 gallons for August (5,880 gpd). The WWC confirmed that it has adequate capacity to supply the airport with potable water for this project (personal communication with Mark Willet, June 28, 2002).

Projected enplanements for the year 2008 are estimated at 347,400. At five gallons per day per passenger, the average day potable water demand is estimated at 4,760 gpd, an average increase of approximately 360 gpd, which is within the capacity of the WWC system.

#### **6.2.1.2 Potable Water Conservation**

The proposed project will meet applicable code requirements. In addition, the following water conservation techniques will be evaluated and used throughout the project, where feasible:

- ◆ Limit the use of municipal water supply to those activities requiring potable water.
- ◆ Use on-site water efficiently in an environmentally sound manner. The Airport relies on an on-site well for irrigation.
- ◆ Install flow restrictors for plumbing fixtures.
- ◆ Install faucets with water conserving aerators.
- ◆ Install water conserving low-flow toilets.
- ◆ Use energy efficient appliances to heat water for showers, dishwashing, and miscellaneous cleaning.

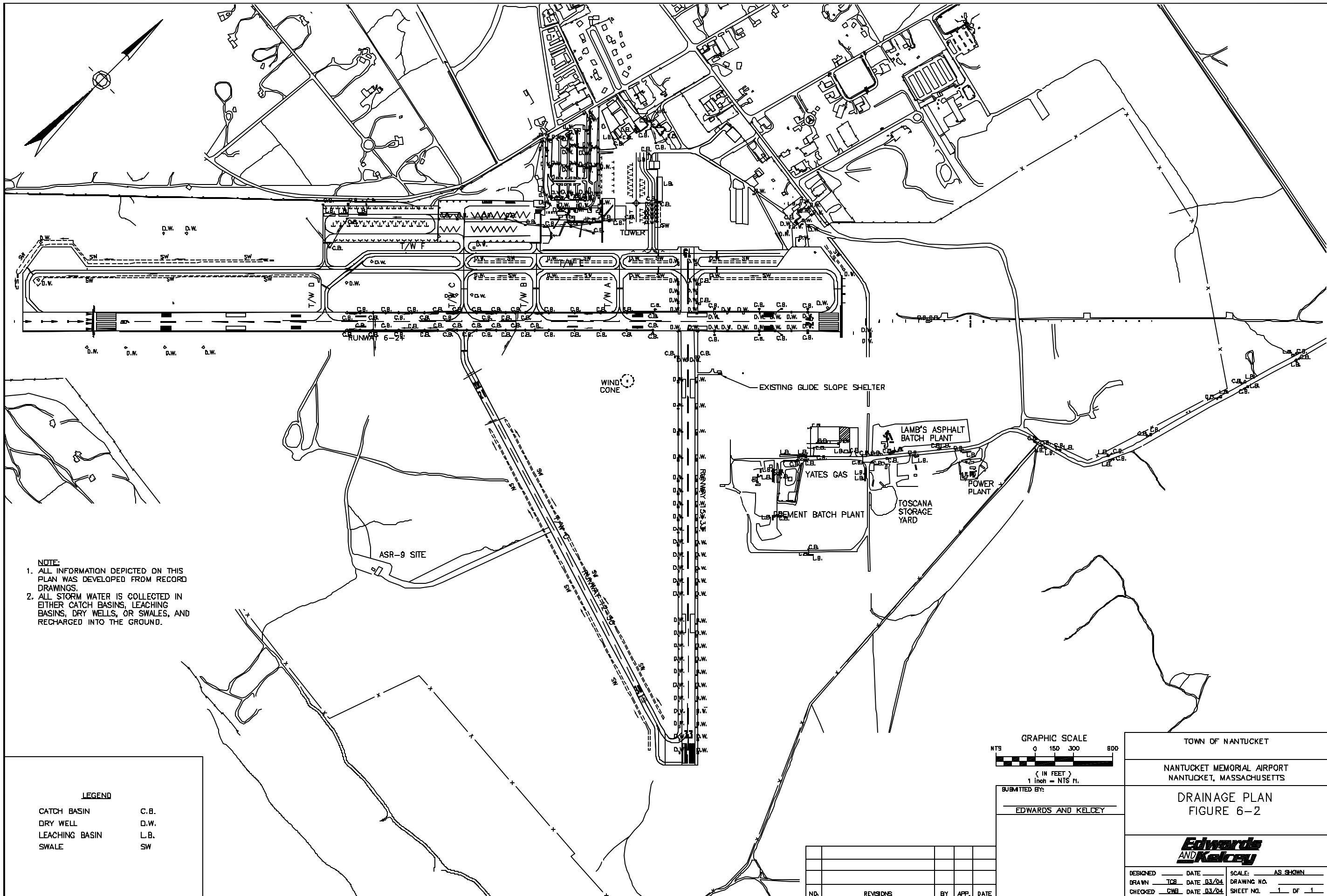
### ***6.2.2 Wastewater Generation***

As reported in Section 6.2.2.1 above, during 2003, the airport used 1,604,250 gallons of water (an average of approximately 4,400 gpd) nearly entirely for potable purposes. Based on the airport land use, it can be assumed that the water used is generally equivalent to wastewater generated. Consequently, the airport can be expected to generate approximately 4,400 gpd of wastewater on an average day and up to 6,000 gpd on a peak day. Based on these numbers, and anticipating the projected increases in enplanements and, subsequently, modest increases in wastewater generation, the Nantucket Wastewater Treatment Facility has sufficient capacity to treat this increase in wastewater volume (personal communication with Eric Shultz) and, therefore, the proposed project is consistent with the Comprehensive Wastewater Management Plan for the Town.

The wastewater treatment facility currently treats nearly 2 million gallons per day (mgd) in the summer and 1 mgd in the winter. Peak flows are 2.8 mgd in the summer and 1.5 mgd in the winter. The average flow from the airport comprises approximately 0.2% of the average summer flow to the plant and approximately 0.4% of the average winter flow. Peak flows from the airport would comprise approximately 0.6% of the average winter flow to the facility and 0.3% of the average summer flow.

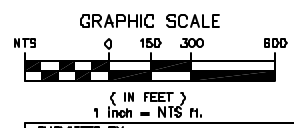
The Comprehensive Wastewater Management Plan, currently being finalized by the Town, anticipates an expansion of the treatment capacity to 3.5 mgd. Following expansion, the airport's average day wastewater flow to the expanded facility is estimated to comprise approximately 0.1% of the design capacity of the facility.

Water conservation measures noted above, such as the installation of water conserving toilets and other plumbing fixtures in the new terminal building, will minimize wastewater generation at the airport.



NOTE:  
 1. ALL INFORMATION DEPICTED ON THIS PLAN WAS DEVELOPED FROM RECORD DRAWINGS.  
 2. ALL STORM WATER IS COLLECTED IN EITHER CATCH BASINS, LEACHING BASINS, DRY WELLS, OR SWALES, AND RECHARGED INTO THE GROUND.

LEGEND	
CATCH BASIN	C.B.
DRY WELL	D.W.
LEACHING BASIN	L.B.
SWALE	SW



SUBMITTED BY:  
 EDWARDS AND KELCEY

TOWN OF NANTUCKET  
 NANTUCKET MEMORIAL AIRPORT  
 NANTUCKET, MASSACHUSETTS

DRAINAGE PLAN  
 FIGURE 6-2

**Edwards  
 AND  
 Kelcey**

DESIGNED \_\_\_\_\_ DATE \_\_\_\_\_ SCALE: AS SHOWN  
 DRAWN TCR DATE 03/04 DRAWING NO. \_\_\_\_\_  
 CHECKED CME DATE 03/04 SHEET NO. 1 OF 1

NO.	REVISIONS	BY	APP.	DATE