Warehouse Plan Example (Harris County)

Harris County Elections Warehouse Planning

In completing Harris County's transition to the eSlate electronic voting system, one of the key tasks for the Harris County-Hart implementation team is planning and implementing warehouse operations in the County's Canino Road Elections Warehouse facility.

The purpose of this document is to provide a prescriptive roadmap to guide major aspects of warehouse operations in the Canino Road facility through the end of calendar 2002. The roadmap is intended to be a "living document," that is, one to be modified and/or expanded to incorporate change or encompass more detailed information, as processes and capabilities are developed and/or refined. The document also provides the flexibility for synchronization with other implementation project documents, such as the Harris County Implementation Plan.

To facilitate ease of modification and/or expansion, this planning document is structured to present information in a series of easily managed, inter-linked exhibits.

Exhibit A, Harris County Warehouse Planning Factors, identifies key factors that impact planning for operations in the Canino Road facility. The purpose of this exhibit is to document team agreement on the overall guidelines and objectives for conducting warehouse transition and initial full-scale eSlate operations. The focus of the information is on "what" is to be accomplished, while leaving definitive guidance on "how" it is to be accomplished to more specific task oriented operating instructions.

Team agreement on the operating guidelines should be reviewed periodically and appropriate expansion and/or modification accomplished to insure the document remains a current touchstone for future planning.

Exhibit B, Harris County Elections Warehouse Workflow, presents a workflow diagram that applies the key planning factors from Exhibit A to major aspects of warehouse material flow. The diagram identifies the basic tasks to be accomplished and provides an overview of task relationships, in both sequence and location (warehouse area). The workflow diagram is a useful pictorial presentation of the roadmap defined by the guidelines and operational objectives presented in Exhibit A.

From the basic framework of the workflow diagram, requirements and defining parameters can be identified for the detailed "how to" instructions referred to above. A sample of such instructions is included as an attachment to the exhibit.

Like the guidance presented in Exhibit A, the workflow diagram should be reviewed periodically and expanded and/or modified to insure its currency.

Exhibit C, Harris County Elections Warehouse Space Planning, provides pictorial depictions of notional warehouse space utilization associated with the workflow

described in Exhibit B. Attachment 1 to the Exhibit, Canino Road Facility Warehouse Planning Data, provides specific data used to calculate space requirements in the notional storage configurations. Additional attachments present a series of floor plans showing the overall layout of the Canino Road warehouse with no equipment in the facility (a useful tool for additional zero-based space planning); a notional layout with Early Voting eSlates pre-positioned and all other eSlate equipment in a static, minimum footprint storage configuration; and, a notional layout of equipment in a pre-deployment configuration.

Exhibit D, Harris County-Election Services Facility Planning, presents a project plan for completing tasks identified in Exhibit B. The plan includes dates for task accomplishment and integrates current schedules for related activities, such as equipment deliveries and acceptance testing. The plan also provides flexibility for updating, modification and expansion, and it should be reviewed periodically for currency and synchronization with the other exhibits, and with associated sub- and master plans. A sample sub-plan is included as an attachment to the exhibit.

Exhibit E, Harris County Warehouse Planning: Observations and Recommendations, provides a reference for documenting and managing various observations and recommendations that, while not included in the major planning factors in Exhibit A, may impact the success of future planning or task completion.

During the initial phase of developing this roadmap, Hart InterCivic arranged for a professional warehousing consultant to visit the Canino Road facility, review current and planned use of the facility and make recommendations for conducting a complete logistics and material flow audit. Upon completion of the visit, the consultant outlined an extensive and thorough study effort encompassing review of the warehouse layout and use of space, and analysis of operating methods and processes.

Although the consultant provided some interesting insights and potentially useful suggestions during his visit, it was agreed that the specialized nature of elections operations, the evolving nature of space requirements and operating processes, and the compressed transition schedule all detracted from the near-term utility of the proposed study effort. Consequently, a more flexible and agile approach was adopted to rapidly focus and draw upon the pooled expertise and knowledge of the Harris County-Hart implementation project team.

Systematic use of the planning tools and information provided in this document can facilitate greatly the planning and execution of warehouse operations in Harris County's Canino Road facility. One of the key factors in successful achievement of transition and full-system implementation objectives will be continued development of process documentation and related operating instructions.

Exhibit A

Harris County Warehouse Planning Factors

1. Johnnie German, Jesse Tovar, Travis Harrell and Rich Geppert met on April 17th at the Harris County Elections Canino Road facility to discuss planning for warehouse operations associated with the final phases of the eSlate electronic voting system implementation.

2. The objective of the warehouse planning initiative is to develop a prescriptive roadmap detailing key aspects of warehouse operations through the end of calendar 2002. A number of essential elements of planning information were identified during the meeting.

3. The "South Side" of the warehouse will be used primarily to accomplish the following functions:

    a. Store eSlate (and DAU) units in their eSlate Booth, in groups of eight, in the eSlate Caddy. eSlates and DAUs will be stored separately.

    b. Store JBCs in their individual shipping containers, in groups of 42, on a standard 48" X 48" pallet.

    c. Accomplish pre-deployment preparation and pre-defining of JBCs.

    d. Stage and distribute ED polling place supplies.

    e. Accomplish Ballot Board functions.

    f. Accomplish residual punch card operations required for contracted elections.

4. The "North Side" of the warehouse will be used primarily to accomplish the following functions:

    a. Store Early Voting (EV) Supply and Computer Goats and pre-positioned EV polling place JBCs, eSlates and DAUs , by delivery route.

    b. Store pre-positioned Election Day (ED) polling place eSlates and DAUs, by delivery routes selected from among those that can be delivered earliest, picked up the latest, are the furthest away, and require the greatest number of eSlates.

    c. Accomplish pre-deployment inspection, preparation, staging and dispatch of eSlate equipment (other than JBCs).

    d. Accomplish post-election receiving, processing and consolidation of eSlate equipment for storage.

e. Store eSlate Caddies and other auxiliary equipment when not in use.

f. Provide general storage space on racks positioned around the perimeter (against the walls) of the facility.

5. eSlate pre-deployment preparation will include: physical integrity of eSlate Booth and leg assemblies, physical condition of individual voting device, reset, and button/function test (and battery insertion, when applicable).

6. Pre-deployment preparation of DAU equipped voting units will be the same as eSlates, with the addition of battery and audio card insertion and inspection of headphones and tactile switches.

7. Post-election processing of eSlate and DAU units will include: general physical condition of booth, positioning and consolidation on Caddy, backup, and removal of batteries and audio cards, where applicable.

8. Initial planning for operations in the “North Side” of the warehouse indicate that present lighting can be used during the transition to conduct operations currently envisioned for the facility. However, as stated in previous studies by County facility engineers, operational requirements yet to be defined will likely dictate improvements in both the intensity and control of illumination in specific areas.

9. The decision to store and maintain Early Voting Computer Goats in the “North Side” of the warehouse (to achieve more efficient use of space and dispatch of equipment) carries with it the need to provide climate control capabilities more suitable for the storage and use of sensitive computer equipment and a significantly higher level of skilled workforce activity.

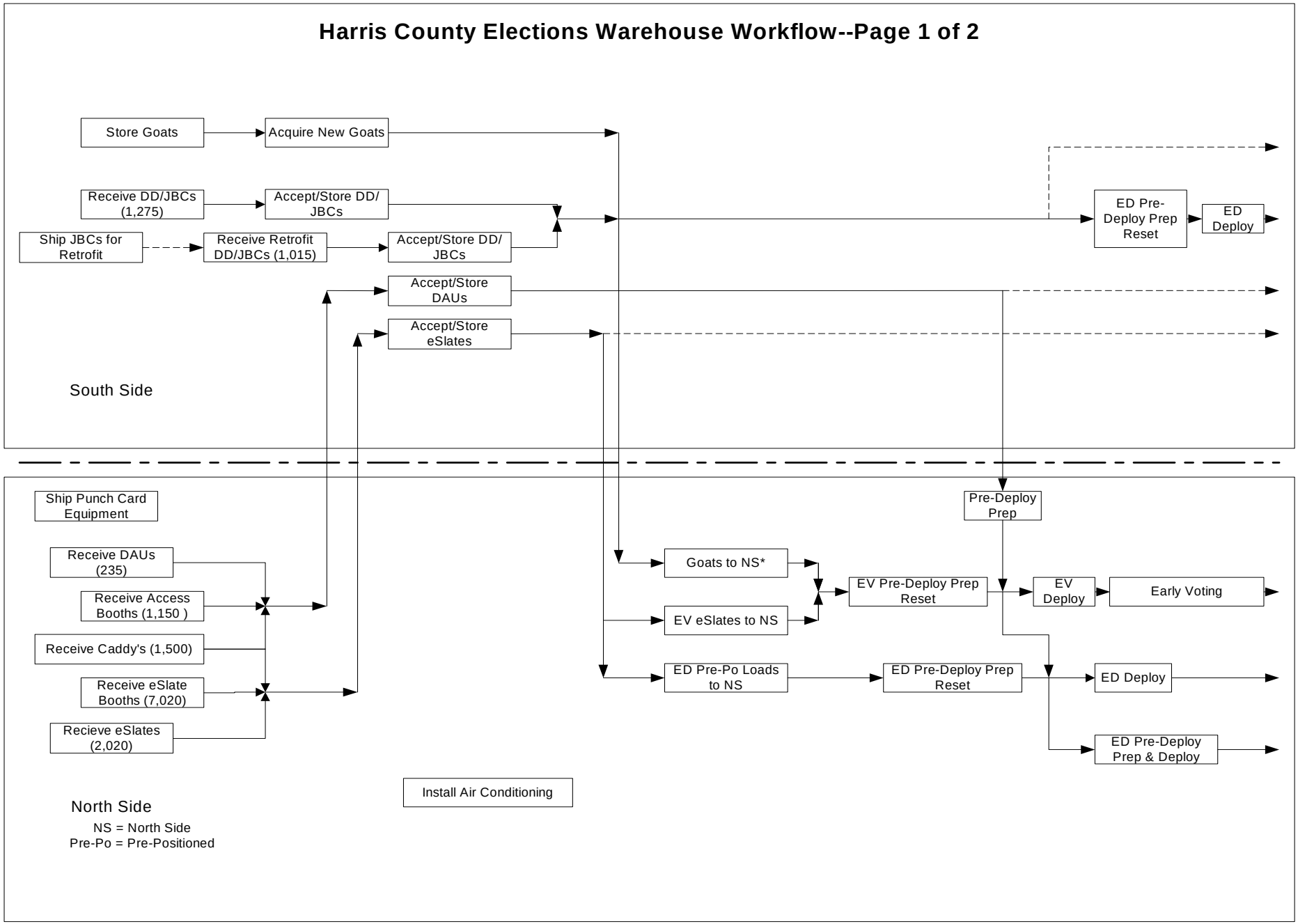
Exhibit B

Harris County Elections Warehouse Workflow

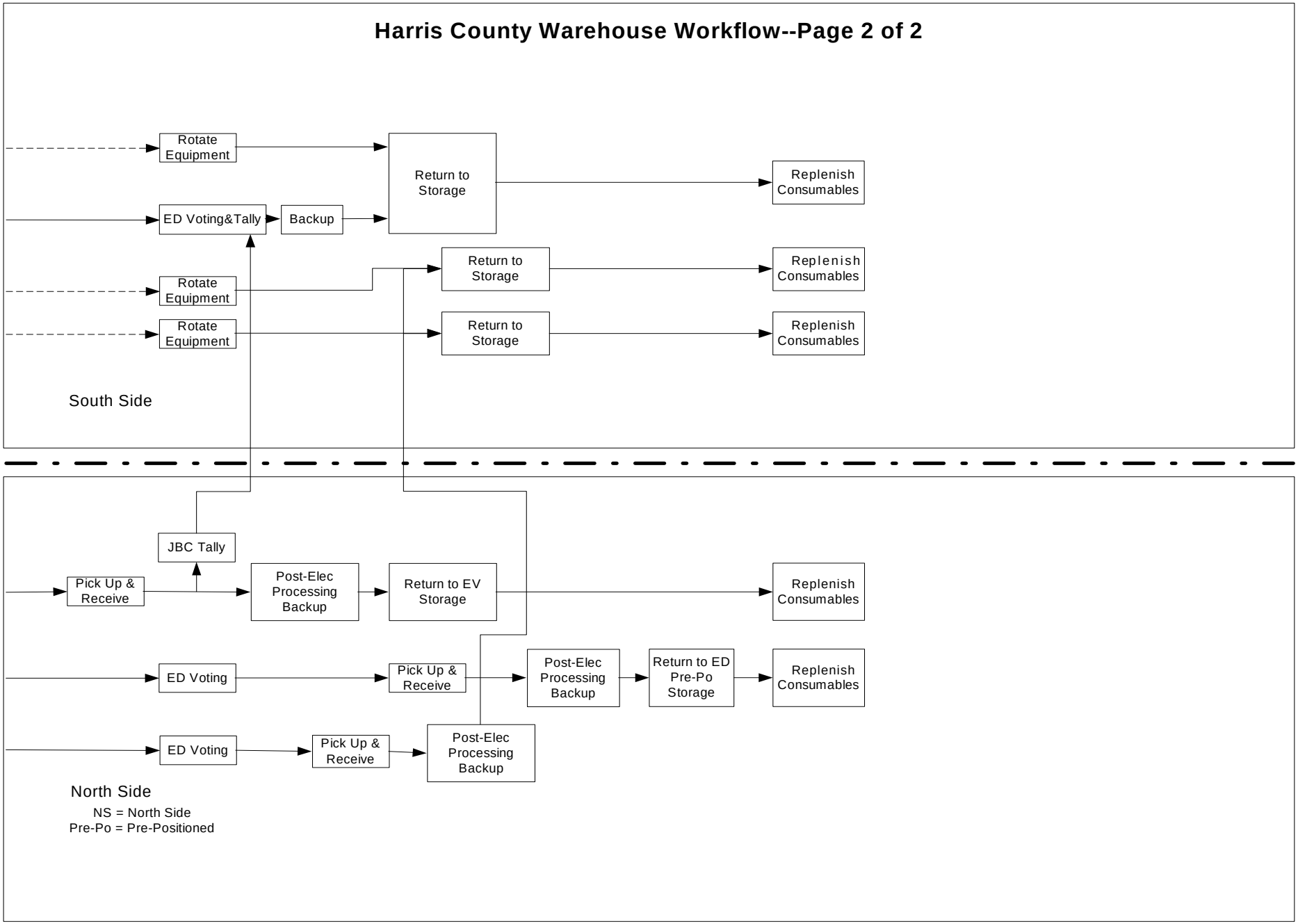
The workflow diagram attached presents a conceptual flow of eSlate warehouse operations for planning purposes. Specific dates have not been included on the diagram, although the relative timing of events is intended to be sufficiently accurate for development of more detailed project plans.

The sample operating instruction attached presents an example of how guidance for the accomplishment of workflow tasks can be documented simply and effectively.

Attachments:
1 – Harris County Warehouse Workflow
2 – Sample Operating Instruction: Harris County eSlate Equipment Integrated Acceptance Testing for eSlates, Booths and Caddies



Harris County Warehouse Workflow--Page 2 of 2



Sample Operating Instruction:

Harris County eSlate Equipment
Integrated Acceptance Testing for eSlates, Booths and Caddies

This document provides instruction for accomplishing acceptance testing on eSlate voting devices, their associated booths and storage caddies. The narrative description is accompanied by a relational map of the acceptance testing process designed and implemented by Harris County for the bulk of the eSlate equipment. Similar procedures can be used for DAUs and JBCs.

Area 1: Unboxing of eSlates and booths
In this area employees remove the eSlate units and booths from their cardboard shipping containers. The empty boxes are routed to the north side of the warehouse for disposal. The eSlates are directed to Area 2 for a Purchasing tag, and the booths are directed to Area 5.

Area 2: Purchasing
In this area County Clerk employees prepare each eSlate device for inventory identification by the Harris County Purchasing Office. The Purchasing Office personnel scan the unit into their database and generate a County inventory tag to go on the unit. County Clerk employees then generate two additional labels with the bar coded serial number of the device, and these labels will eventually be placed on the outside of the booth in which the device will be stored, transported and set up for voting. The device is then put on a rolling cart, and the two bar code labels are attached to the eSlate by scotch tape.

Area 3: Unboxing of Caddies
In this area, caddies are removed from their shipping containers. The empty boxes and wrapping are routed to the north side of the warehouse for disposal. (The caddies may also be un-boxed on the north side of the warehouse upon being removed from the delivery truck.) Once un-boxed, the caddies are set-up in Area 4 for holding until needed for loading fully accepted units.

Area 4: Caddy Holding Area
The unpacked and unwrapped caddies are stored here until they are needed in Area 7.

Area 5: Booth Preparation
Employees in this area set up each booth on tables. After set up, each booth is taken off the tables and fully deployed with the legs extended. The voter instruction flyers are placed into the placard holders on the sides, and the “American Flag” sign is posted with Velcro on the inside top cover of the booth. The booths are then taken, still fully deployed, to Area 6, where they await transport to Area 7.

Area 6: Completed Booths
Booths are stored here fully deployed and ready to accept units. From this area they are taken in groups of eight to Area 7.

Area 7: Unit Assignment to Booths and eSlate Acceptance Test
This area contains two workstations, each with a PC that runs Reset PVS. Each PC is connected to a JBC with an Acceptance Test MBB inserted. Each testing team works on one string of eight booths at a time. Each PC station has room for sixteen booths, in two back-to-back rows of eight.

The booth team brings over eight fully deployed booths from Area 6. The testing team then selects eight eSlates from Area 2 and fits them into the booths, ensuring that all connections fit securely. As the eSlate is placed into the booth, the paper with the two serial number ID tags is removed and taped onto the top of the booth lid. After the unit has been secured in the booth and all booth cable connections are complete, the serial number bar code tags are affixed to the booth. The testing team then proceeds with testing of the eSlate unit according to normal procedures.

While the testing team is outfitting each booth with an eSlate device and conducting the acceptance test, the booth team is breaking down the other line and preparing the next row of eight booths for the testing team.

Once acceptance testing is complete, each booth is closed, its legs are collapsed into the storage configuration, and the unit is loaded onto a waiting caddy. After the booths are properly secured onto the caddy, the caddy is taken to Area 8 for storage.

Area 8: Caddy Storage
The fully outfitted caddies are stored here. Caddies containing DAUs and eSlates are stored separately.

Integrated Acceptance Test Process Areas

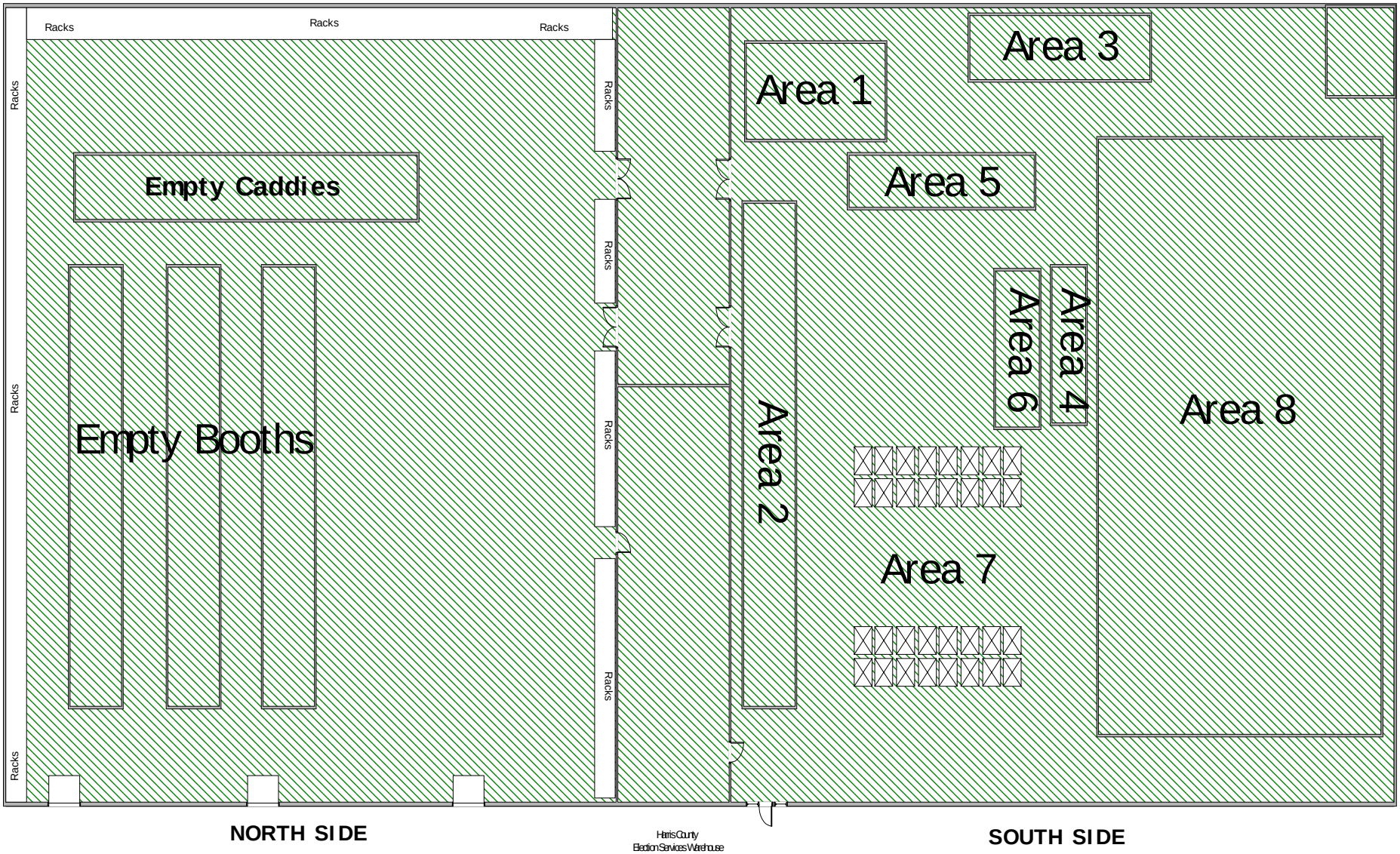


Exhibit C

Harris County Elections Warehouse Space Planning

Attachments:
1 – Canino Road Facility Warehouse Planning Data
2 – Canino Road Facility Floor Plan: Empty
3 – Canino Road Facility Floor Plan: Minimum Storage with Early Voting Pre-Positioned
4 – Canino Road Facility Floor Plan: Early Voting and Election Day Pre-positioned

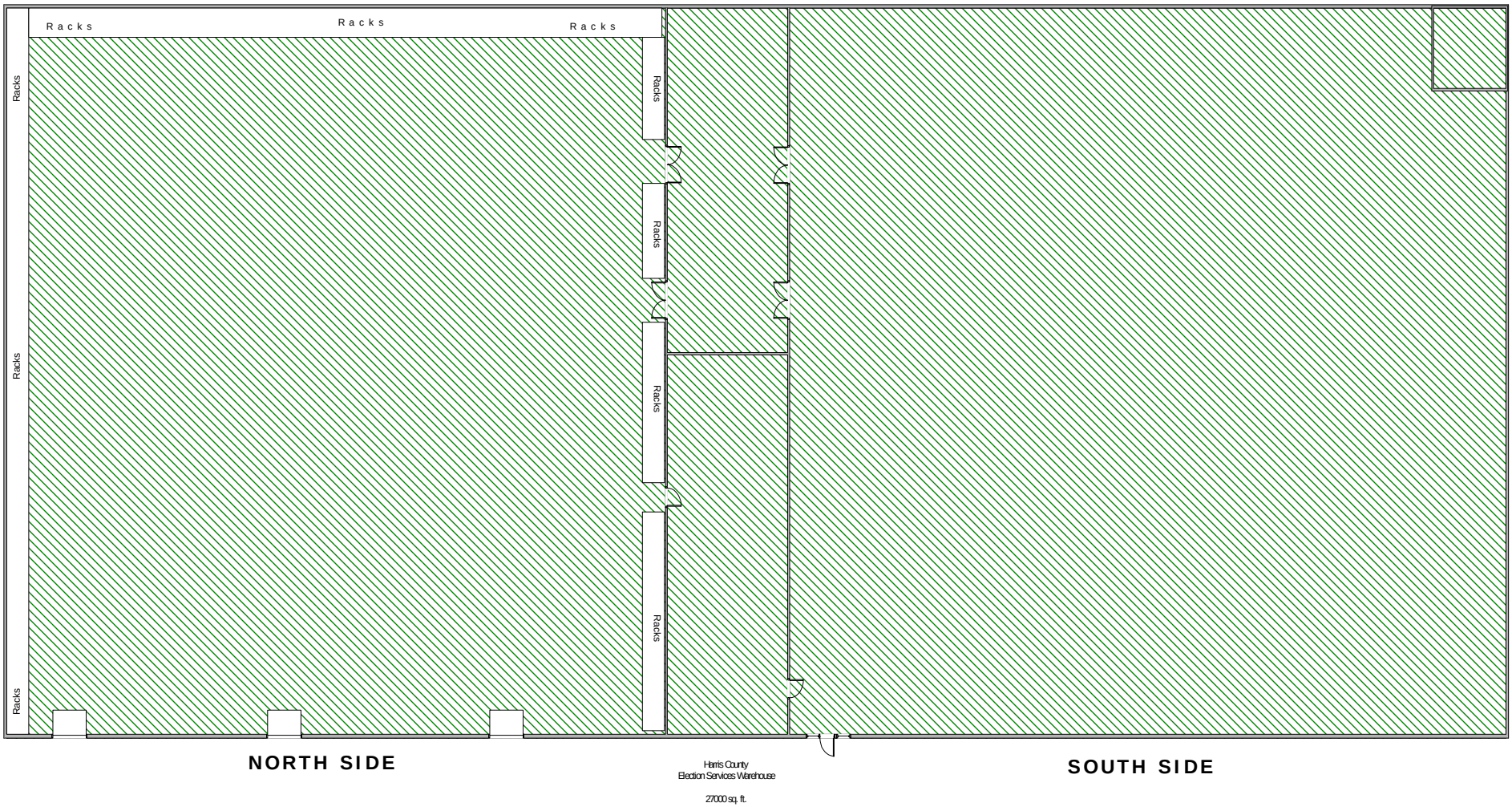
Canino Road Facility Warehouse Planning Data

Item	Total Number of Items	Item Container	Container Dimensions (Inches)				Total Number of Containers	Total Sq Feet Required for Containers	Storage Unit	Containers per Storage Unit	Storage Unit Footprint (Inches)			Total Number of Storage Units	Total Warehouse Footprint Sq Ft
			Width	**Depth**	**Height**	**Sq Ft**					**Width**	**Depth**	**Sq Ft**		
eSlate	7,020	Booth	25	25.5	7	4.427	7,020	31,078	Caddy	8	27	30	5.625	878	4,939
DAU	1,150	Booth	25	25.5	7	4.427	1,150	5,091	Caddy	8	27	30	5.625	144	810
JBC	2,290	Box	21	17	10	2.349	2,290	5,379	Pallet	42	48	48	16	55	880
Extra Caddies	478	Free stand	27	30	60	5.625	478	2,689	Caddy	1	27	30	5.625	478	2,689
Computer Goats	31	Free stand	24	48	64	8	31	248	Goat	1	24	48	8	31	248
Supply Goats	31	Free stand	24	48	64	8	31	248	Goat	1	24	48	8	31	248
EV Pre-Positioned Equipment*															
eSlates/DAUs	600	Booth	25	25.5	6.5	4.427	600	2,656	Caddy	8	27	30	5.625	75	2,435
ED Pre-Postioned Equipment**															
eSlates/DAUs	896	Booth	25	25.5	6.5	4.427	896	3,967	Pallet	8	27	30	5.625	112	1,838
ED Supplies	TBD														
Miscellaneous Administrative Equipment	TBD														
In/Out Equipment Processing Space	TBD														
Equipment Maintenance Work Areas	1					500									500
Administrative Work Areas	1					1,127									1,127
Break Room Facility	1					522									522

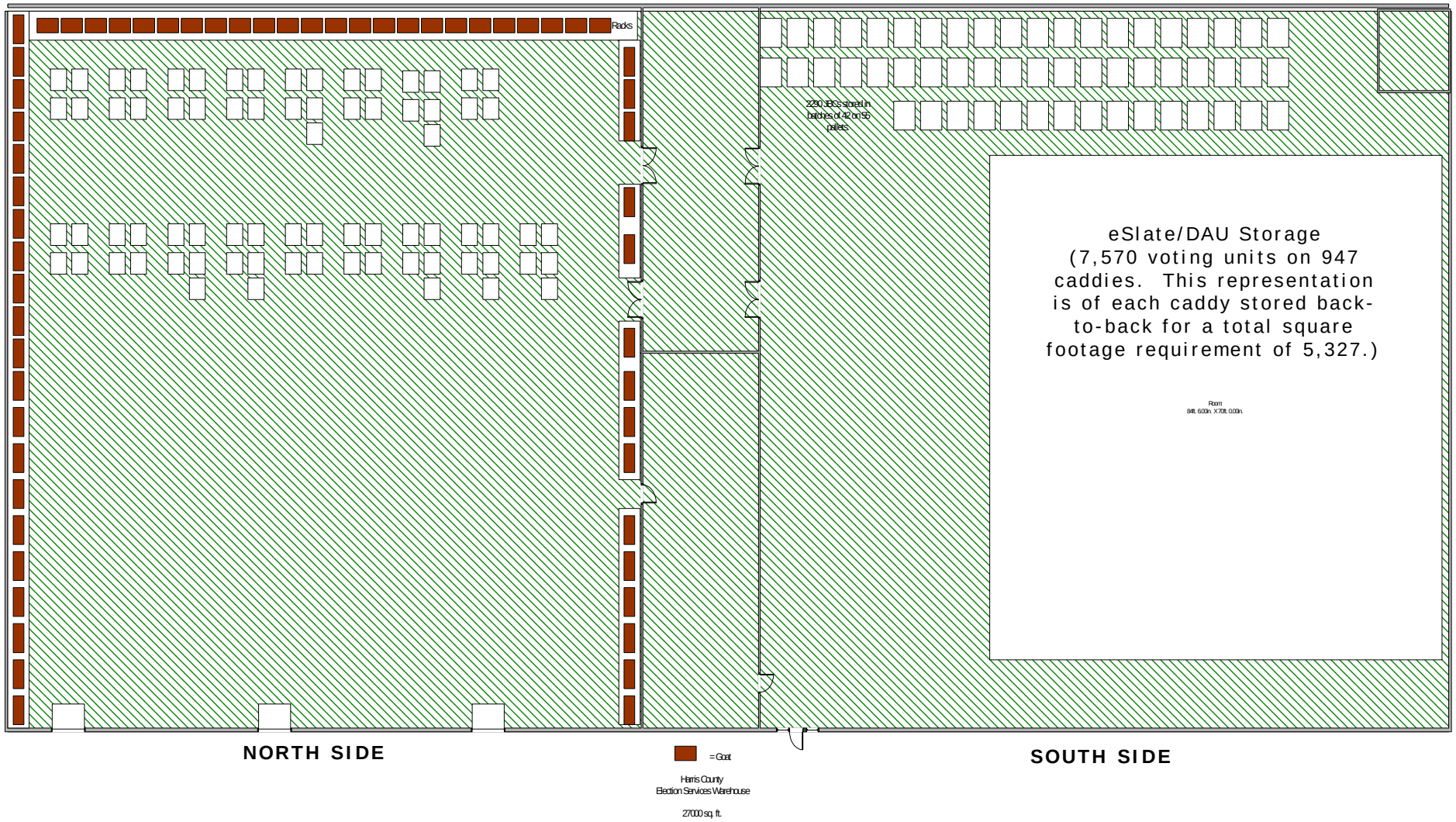
*Total includes equipment footprint of 422 sq. ft. plus 2013 sq. ft. of aisle space.

**Total includes equipment footprint of 630 sq. ft. plus 1208 sq. ft. of aisle space.

Canino Road Facility Floor Plan:
Empty



Canino Road Facility Floor Plan:
Minimum Storage with Early Voting Pre-Positioned



Canino Road Facility Floor Plan:
Early Voting and Election Day Pre-Positioned

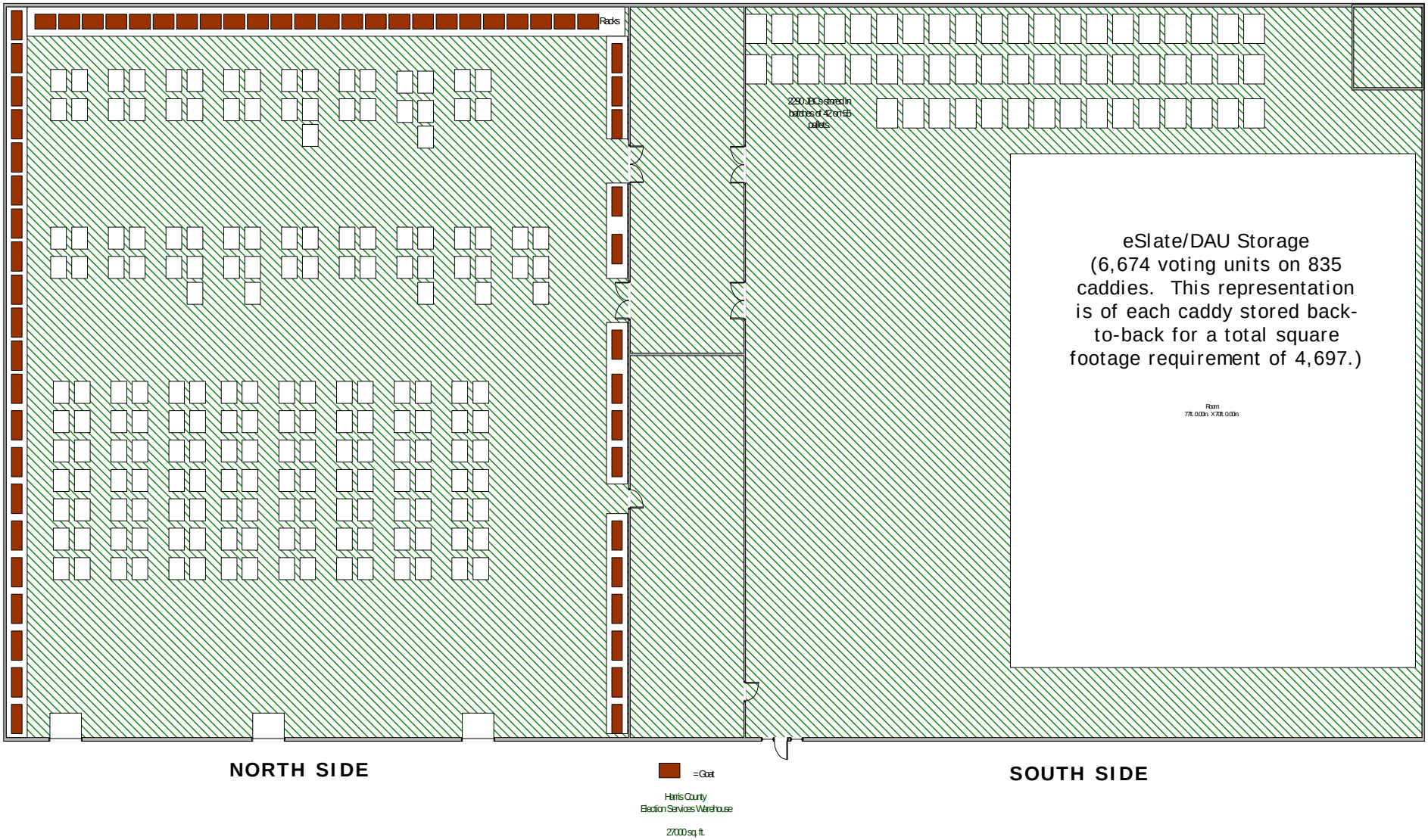


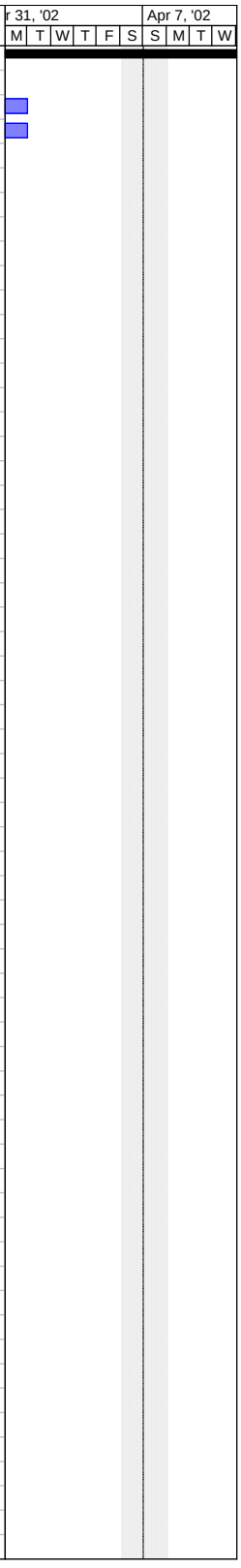
Exhibit D

Harris County Election Services Facility Planning

Attachments:
1 – Project Plan: Harris County Election Services Facility Planning
2 – Sample Sub-plan: Harris County eSlate Equipment Final Acceptance Schedule and Tracking Plan

Project Plan: Harris County Election Services Facility Planning

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Re-distribute Resources**	**13 days**	**Mon 4/1/02**	**Wed 4/17/02**	
2	Ship punch card equipment to Scarsdale	3 days	Mon 4/15/02	Wed 4/17/02	
3	Send Goats to North side	1 day	Mon 4/1/02	Mon 4/1/02	
4	Acquire and store new Goats (North side)	1 day	Mon 4/1/02	Mon 4/1/02	
5					
6	**Delivery and Acceptance Testing**	**55 days**	**Mon 4/15/02**	**Fri 6/28/02**	
7	Ship JBCs for retrofit	1 day	Mon 4/15/02	Mon 4/15/02	
8	Receive DAUs	1 day	Wed 4/17/02	Wed 4/17/02	
9	Receive eSlates	1 day	Wed 4/17/02	Wed 4/17/02	
10	Accept/Store DAUs	44 days	Wed 4/17/02	Mon 6/17/02	8SS
11	Receive deep dish JBCs	1 day	Wed 5/1/02	Wed 5/1/02	
12	Receive eSlate booths	1 day	Wed 5/1/02	Wed 5/1/02	
13	Receive eSlate booths	1 day	Wed 5/1/02	Wed 5/1/02	
14	Accept booths	42 days	Wed 5/1/02	Thu 6/27/02	12SS
15	Accept/Store deep dish JBCs	23 days	Thu 5/2/02	Mon 6/3/02	11
16	Receive deep dish JBCs	1 day	Wed 5/8/02	Wed 5/8/02	
17	Receive eSlate booths	1 day	Wed 5/8/02	Wed 5/8/02	
18	Receive caddies	1 day	Wed 5/8/02	Wed 5/8/02	
19	Accept caddies	29 days	Wed 5/8/02	Mon 6/17/02	18SS
20	Accept/Store eSlates	27 days	Fri 5/10/02	Mon 6/17/02	9SS+17 days
21	Receive deep dish JBCs	1 day	Wed 5/15/02	Wed 5/15/02	
22	Receive eSlate booths	1 day	Wed 5/15/02	Wed 5/15/02	
23	Receive caddies	1 day	Wed 5/15/02	Wed 5/15/02	
24	Receive Disabled Access Booths	1 day	Wed 5/15/02	Wed 5/15/02	
25	Receive caddies	1 day	Thu 5/23/02	Thu 5/23/02	
26	Receive caddies	1 day	Mon 6/3/02	Mon 6/3/02	
27	Receive retrofitted JBCs	5 days	Wed 6/5/02	Tue 6/11/02	
28	Accept and store retrofitted JBCs	18 days	Wed 6/5/02	Fri 6/28/02	27SS
29	Receive eSlate booths	3 wks	Thu 6/6/02	Wed 6/26/02	
30					
31	**Early Voting Operations**	**100 days**	**Mon 7/1/02**	**Fri 11/15/02**	
32	EV eSlate/DAU Pre-deploy prep / reset	1 day	Mon 7/1/02	Mon 7/1/02	6
33	Move EV eSlates to North Side	1 day	Mon 7/15/02	Mon 7/15/02	
34	Deploy and Use Goats	40 days	Mon 9/23/02	Fri 11/15/02	
35	JBC predefine	1 day	Mon 9/23/02	Mon 9/23/02	
36	Deploy to Early Voting	3 days	Mon 10/14/02	Wed 10/16/02	
37	Pick-up and receive Goats	4 days	Mon 11/4/02	Thu 11/7/02	40
38	Return to EV storage	1 day	Fri 11/8/02	Fri 11/8/02	37
39	Replenish consumables	1 wk	Mon 11/11/02	Fri 11/15/02	38
40	Early Voting period	10 days	Sat 10/19/02	Fri 11/1/02	
41	Post-election processing / backup/reset	1 day	Wed 11/6/02	Wed 11/6/02	
42	Rotate equipment	1 day	Wed 11/6/02	Wed 11/6/02	41SS
43					
44	**Install Air Conditioning on North Side**	**30 days**	**Mon 7/8/02**	**Fri 8/16/02**	
45					
46	**Election Day Operations**	**77 days**	**Mon 8/12/02**	**Tue 11/26/02**	
47	Election Day eSlate pre-deployment prep / reset	2 wks	Mon 8/12/02	Fri 8/23/02	
48	Election Day DAU pre-deployment prep / reset	4 days	Mon 8/12/02	Thu 8/15/02	47SS
49	Pre-position Election Day loads to North Side	1 wk	Mon 8/26/02	Fri 8/30/02	47
50	Set up polling place supply distribution and equipmer	45 days	Mon 9/2/02	Fri 11/1/02	
51	Election Day JBC pre-define	1 wk	Tue 10/1/02	Mon 10/7/02	
52	Election Day eSlate deployment	2 wks	Mon 10/21/02	Fri 11/1/02	49,47
53	Election Day DAU deployment	2 wks	Mon 10/21/02	Fri 11/1/02	52SS
54	Election Day JBC distribution	2 days	Sat 11/2/02	Sun 11/3/02	
55	Election Day	1 day	Tue 11/5/02	Tue 11/5/02	
56	Pickup/Receive equipment	2 wks	Wed 11/6/02	Tue 11/19/02	55
57	JBC Backup and Reset	3 days	Wed 11/6/02	Fri 11/8/02	55
58	Store JBCs	1 day	Mon 11/11/02	Mon 11/11/02	57
59	eSlate/DAU Backup and Reset	1 wk	Mon 11/11/02	Fri 11/15/02	56SS,57
60	Store eSlates/DAUs	1 wk	Mon 11/11/02	Fri 11/15/02	59SS
61	Return eSlates/DAUs/JBCs to pre-positioned storage	1 wk	Mon 11/11/02	Fri 11/15/02	60SS
62	Replenish consumables	1 wk	Wed 11/20/02	Tue 11/26/02	56



Final Acceptance Schedule and Tracking Plan

Units	17-May	24-May	31-May	7-Jun	14-Jun	21-Jun	28-Jun	Actual	
eSlate	1000							**2408**	
DAU									
Booth	1000							**2408**	
Caddy	125							**301**	
JBC									
eSlate		1000						**1112**	
DAU								**535**	
Booth		1000						**1647**	
Caddy		125						**206**	
JBC									
eSlate			1000					*Done*	
DAU								*Done*	
Booth			1000					**852**	
Caddy			125					**107**	
JBC								**208**	
eSlate				520				*Done*	
DAU				480				*Done*	
Booth				1000					
Caddy				125					
JBC									
eSlate								*Done*	
DAU					55			*Done*	
Booth					1280				*55 for DAUs and the balance of booths delivered directly to Harris
Caddy					160				
JBC					400				
eSlate								*Done*	
DAU								*Done*	
Booth						1445			*Half of the 2890 booths from Austin
Caddy						181			
JBC						400			
eSlate								*Done*	
DAU								*Done*	
Booth							1445		*Half of the 2890 booths from Austin
Caddy							659		*181 for the 1445 booths and visual inspection/testing of the balance
JBC							475		

Exhibit E

Harris County Warehouse Planning: Observations and Recommendations

The purpose of this document is to provide a reference for documenting and managing various observations, recommendations or other information that may impact the success of future planning or task completion.

Observation 1

A review of the notional warehouse space utilization diagrams in Exhibit C indicates there is sufficient space in the Canino Road facility to perform the warehouse functions associated with the eSlate electronic voting system. Sufficiency is dependent upon efficient and flexible use of the entire facility to accomplish eSlate workflow functions described in Exhibit B. While these functions have been identified through careful study of both operational and system requirements, flexibility of warehousing facilities must be maintained in order to accommodate evolving new operational requirements and system capabilities.

Observation 2

Although the South Side of the Facility will continue to be used for a variety of functions similar to those that it has accommodated in the past, use of the North Side must shift from primarily a dry storage and staging facility to storage, processing, maintenance, and distribution. The decision to store and maintain Early Voting Computer Goats in the North Side of the warehouse (to achieve more efficient use of space and dispatch of equipment) carries with it the need to provide climate control capabilities more suitable for the storage and use of sensitive computer equipment and a significantly higher level of skilled workforce activity.

Recommendation A

If the County elects to provide climate control capabilities for the North Side of the Canino Road facility, the facility project should be carefully planned to minimize the impact on transition activities.

Observation 3

While better lighting may be required in the North Side of the Facility, enhanced illumination of areas in which high skill level tasks are being performed should be achieved with temporary supplemental lighting while workflow processes are being proven and flexible new permanent lighting systems are being evaluated for use in the future.

Observation 4

The workflow planning accomplished and described in this document reflects constraints imposed by a fixed schedule of election activities, new equipment deliveries and implementation project objectives and milestones. These constraints limited the degree to which major facility alterations could be considered as viable options at this stage of the system implementation. Clearly, however, there are more extensive changes to the Canino Road facility that might be made to improve its utility.

In a like manner and for the same reasons, not all potential opportunities to achieve operational enhancements through major changes in current processes were explored fully.

Observation 5

During the initial phase of developing this roadmap, Hart InterCivic identified a professional warehousing consultant who visited the Canino Road facility, reviewed current and planned use of the facility and outlined an extensive and thorough study effort encompassing complete review of the warehouse layout and use of space, and analysis of operating methods and processes. Such a study effort could be beneficial to the County when transition to the eSlate electronic voting system is complete and a "normal" operations tempo has been achieved for the warehouse.

Recommendation C

Upon successful implementation of eSlate full-system operations and completion of an adequate cross-section of election activity, a thorough review of warehouse operations should be conducted to identify further facility and operational modifications needed to enhance efficiency and effectiveness.