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components. Extensive durability testing has been conducted as part of the System's ISO 9001 certified development and manufacturing quality process.

The eSlate is tested using state of the art test methodologies for validating product reliability and manufacturing processes. Before placing the eSlate on the market, the designs were validated for product life and reliability using Highly Accelerated Life Testing (HALT) techniques. HALT testing subjects the product to destructive temperature and vibration stresses – enough to expose any weaknesses in design or manufacture. Any weaknesses exposed are addressed and testing continues with the process repeating until the equivalent end-of-life is reached.

To monitor manufacturing process tolerances, sample units from each production run are subjected to Highly Accelerated Stress Screening (HASS). HASS subjects the units to extreme temperature stresses, not enough to destroy the unit as in HALT testing, but stressful enough to expose any intermittent or latent defects – before the unit is released to the customer. The result of the HASS test has a baseline yield established which indicates that the manufacturing processes are within tolerance.

Hart InterCivic continually tests the durability of the eSlate System. For example, in July 2002 a JBC, an eSlate with the DAU attached, and the associated cables necessary to outfit a Precinct Voting System with hardware underwent salt fog testing. This testing provided objective data that the eSlate election solution is able to withstand twelve years of storage under harsh conditions.

Peripheral Equipment. In addition to eSlate specific hardware, the System also uses off-the-shelf computers and third party peripheral equipment that is readily available on the commercial market. All such equipment included in this proposal has been selected for its demonstrated performance, dependability, durability, and maintainability.

(4) Describe the method for printing a voter receipt. Is additional equipment necessary? If so, what is needed?

Hart InterCivic Response

The eSlate System prints a voter receipt through the JBC. No additional equipment is necessary.

When the voter has cast his or her ballot, the polling place official presses the "CHECK CODE" button on the JBC. The unique architecture of the eSlate System immediately notes the status of the access code – in this case "Assigned and Cast" – and *a receipt for the voter can be printed simply by pressing the "Print" command on the JBC screen.* The receipt includes the day and time of voting, the access code that was assigned to the voter, and other pertinent data (the receipt does *not* show cast votes).



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18.0 PRECINCT VOTING (POLL WORKER)

18.1 Requirements

- a. **Set-up of the polling place shall require a minimum number of electrical and electronic connections.**

Hart InterCivic Response

There is only one unit (the JBC) to plug into electrical power, and only the JBC receives the election database (MBB). Poll Workers merely connect the eSlates to the JBC in a "daisy-chain" fashion. There are no stand-alone units that have to be individually powered.

- b. **The proposed system shall be easy for the poll workers to transport, set up, open, close, and take down.**

Hart InterCivic Response

The eSlate's voting booth/storage container is designed to be easy to store, transport, set up, and dismantle. It is secure, and can be sealed with a standard security seal when left unattended or in storage. It is a private, comfortable voting space for every voter. Legs and extensions store outside the booth for easy access and set-up by poll workers. The booth with the eSlate stored inside weighs less than 29 pounds, making it easy to move and assemble.

- c. **The vendor shall provide poll workers with instructions that are easy to follow and easy to understand.**

Hart InterCivic Response

Hart provides training, simple instruction sheets, and trouble-shooting guides designed for Poll Workers by Hart InterCivic's team of professional educators. These instructions have been extensively tested in other eSlate elections. A complete list and examples of poll worker instructional materials is included in *Attachment 6: Election Day Quick Reference*.

- d. **The proposed system shall provide a method of activating a device that can be clearly understood by the poll worker.**

Hart InterCivic Response

Initial activation of voting devices when opening the polls is as easy as plugging in the JBC and touching the ENTER button on each device.

Because the JBC is connected to each eSlate, there are no smart cards or electronic key devices for voters to operate or polling place officials to collect after the voting process, eliminating a key point of failure or potential security weakness.



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Poll workers are not required to initialize the voting unit for each voter. This results in significant cost savings over systems that require poll worker intervention.

When the polls have closed, all information needed by poll workers is consolidated in the JBC; no voting data must be obtained from individual eSlate units, and the single MBB contains the complete returns for the precinct, ready for modem transmission or transport to a collection site.

- e. The proposed system shall provide poll workers with a method to immediately detect if a voting unit is not operating properly.**

Hart InterCivic Response

All major subsystems and assemblies (specifically BOSS, eSlate units, DAUs, JBCs, Ballot Now, and Tally) include automatic diagnostic testing. These tests include error checking of function output, input validation, Cyclic Redundancy Checks, and real-time error checking. When power is applied to the eSlate Voting Unit, a diagnostic check of the system components is automatically performed. The results of the test (pass/fail) are recorded in the audit log of the unit.

Additional manual functional tests are presented to the operator following the diagnostic test, including testing of the input switches and buttons on the eSlate and DAUs.

Before the polls are opened or any application is used, tools are available to notify poll workers and operators of any possible problems. Once the polls have opened, poll workers may monitor the eSlate System in the polling place by observing the status indicator lights on the JBC. While in operation, the eSlate monitors itself and in the event of a malfunction, ceases operation and notifies the user with an on screen message "System Alert." The status indicator light on the JBC will extinguish indicating a problem with the unit.

- f. Any removable components shall be easy for poll workers to access and remove.**

Hart InterCivic Response

The only removable components to the eSlate Precinct Voting System are the MBB and the paper tape on the JBC. These components are easily mastered, and training on each is provided through eSlate's comprehensive training curriculum.

- g. Printer shall be easy for the poll worker to operate.**



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Hart InterCivic Response

The printer at the polling place is built in to the JBC. All printer output (Access Codes, voter receipts, polling place reports) are generated from clear menus on the JBC screen.

18.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Describe the process used by the poll workers to transport, set up, open, close and take down the proposed system for voting. Describe each activity the worker shall complete prior to opening the polls, during the voting day, at the close of voting, and to return results to the counting location.**

Hart InterCivic Response

The eSlate System may be transported by a transportation/delivery company or poll officials. It is lightweight and compact, and several eSlate booths can be transported in a standard passenger vehicle. As an added benefit, the booth can be secured using a standard security seal, providing tamper-proof protection.

Hart InterCivic designed the eSlate System not only to be voter friendly, but also to be easy to operate for poll workers and Boulder County Clerk and Recorder staff. Special attention was placed on easy-to-read and clear descriptions of the steps necessary for proper operation of the eSlate System.

When operating the JBC, poll workers follow a simple, menu-driven process and may perform functions only in the authorized sequence. Any unauthorized function attempts are rejected immediately. Options on the JBC screen are visible and available to poll workers only at the time they should be performed.

Polling place set-up with the eSlate System is accomplished easily and swiftly. It does not require special technical skills, physical strength, or unique facility features due to fact that the eSlate equipment is lightweight, compact, and easy to install. Only one power outlet is required -- the only electrical connection is to the JBC -- and the cable connecting the JBC to the eSlates carries both power and data. This also minimizes the clutter of power cords and extension cords at the polling place.

A typical polling place (using one JBC and five eSlates) may be readied for voting as detailed in *Exhibit IV-14: Readyng the Polling Place*.



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POLLING PLACE SETUP		
Task	Time to Complete	Personnel Needed
Assemble 5 booths	< 10 minutes	2 or 3 Poll Workers
Connect 5 eSlates & the JBC in a daisy chain	< 2 minutes	2 or 3 Poll Workers
Apply power to the equipment & perform functional checks	<1 minute	1 Poll Worker
Power up the system	< 1 minute	1 Poll Worker
Election official signs off/accepts	1 minute	1 election official
Total	<15 minutes	2 or 3 Poll Workers

Exhibit IV-14: Readyng the Polling Place. The table above details the time and personnel required to prepare the polls.

OPEN POLLS		
Task	Time to Complete	Personnel Needed
Insert MBB in JBC (May be done at warehouse)	<1 minute	1 Poll Worker
Apply power to JBC	Negligible	1 Poll Worker
Enter password	<1 minute	1 Poll Worker
Identify/confirm polling locations	1 minute	1 Poll Worker
Open polls	1 minutes	1 Poll Worker
Assign booths (Press ENTER on each booth)	1 minutes	1 Poll Worker
Print "Open Polls" tape	3 minutes (varies with ballot size)	1 Poll Worker
Total	<11 minutes	1 Poll Worker

CLOSE POLLS		
Task	Time to Complete	Personnel Needed
Polls are closed by pressing "Close Polls" button and confirming action	3 minutes	1 Poll Worker
Final reports are printed from the JBC (JBC)	5 minutes (varies with ballot size and number of copies to print)	1 Poll Worker
Preliminary reports are transmitted by modem from JBC (optional)	3 minutes	1 Poll Worker
System is powered down	1 minute	1 Poll Worker
Total	<12 minutes	1 Poll Worker

Exhibit IV-15: Open and Close Polls . The tables above detail the time and personnel required to open and close the polls.



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Ease of transportation is enhanced by the size of the eSlate equipment. The largest component, the eSlate voting booth, measures just 24.75" x 25.75" x 6.5" (when folded). It may be moved with ease through regular door openings into polling places and storage areas of various sizes.

Each eSlate Voting Unit weighs approximately 5.2 pounds without the backup power battery pack installed, and approximately 7.7 pounds with the battery pack installed. Each JBC weighs approximately 6.4 pounds and the eSlate Voting Booth weighs less than 29 pounds, with the eSlate and battery pack included. As a result, *the eSlate voting system is the lightest DRE voting system on the market today*. The low unit weight and small, regularly shaped physical profiles of the other system components makes it easy to store them efficiently in compact locations until needed for voting.

Once the polls have opened, poll workers may monitor the eSlate System in the polling place by observing the status indicator lights on the JBC.

Each eSlate and DAU is represented by a light that is green when the booth is available for use, red when the booth is in use, and unlit if the unit is disconnected from the network. The light also flashes red and green if the voter has pressed the HELP button twice to request assistance.

If a voting unit malfunctions, it will be off-line. Its indicator light will be extinguished, thus prompting immediate detection by poll workers monitoring the JBC.

Polls are closed through the JBC. Closing polls is initiated by pressing a clearly labeled "CLOSE POLLS" button on the JBC and following a short, menu-driven sequence of events. It is not necessary to individually deactivate each machine, unlike competitors' units.

Complete official results also may be transmitted by physically transporting the MBBs to a tabulation center or substation for rapid download into the Tally tabulation and reporting application. This may be accomplished by carrying the JBC with the MBB sealed and intact, or by carrying the MBB alone. If the MBB is removed from the JBC at the polling place, it may be placed, along with provisional voter envelopes and other records (depending on County procedure) in its own security pouch and sealed with a security seal. Cast Vote Records are electronically stored on the MBB and ready to be read in the Tally application.

In addition, Tally can export all reports in .PDF format to removable media, thereby facilitating easy distribution of these reports to the Internet. Tally also has the ability to export reports and report data in Access, ASCII, Excel, HTML, and XML formats to facilitate electronic transmission through the medium selected by local Elections Officials.



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- c. Provide description of instructional material for setup and operation of the equipment at the polls, and samples if available.**

Hart InterCivic Response

Hart provides printed materials designed to assist poll workers and election office staff in the confident, accurate operation of each eSlate component.

Every poll worker has at his or her fingertips the eSlate Poll Worker's Operations Desk Reference and a Quick Reference. The latter is a short, easy-to-follow two-page guide highlighting the process necessary to complete the major tasks with the eSlate polling place components. More detailed training manuals serve as an additional resource. Specially designed checklists and task logs (Ballot Now Reprinted Ballots Log) also help poll workers, election office workers, and administrators complete their assigned tasks accurately and with assurance.

The steps preparing each polling place are taught in two classes, the eSlate Support Procedures Course and the eSlate System Management and Tasks Course.

Examples of the materials described in this section are included as *Attachment 6: Election Day Quick Reference*.

- d. Describe the removable components and how the poll worker will access them.**

Hart InterCivic Response

The only removable components in the eSlate Precinct Voting System are the MBB and the paper tape on the JBC.

Removal of the MBB occurs only if the County determines by policy that the MBB is to be removed by the polling place official. If this is the case, access to the MBB is a simple matter of sliding the PC card out of the slot. (As a safeguard against unauthorized or unintentional removal of the MBB, Hart recommends that a security seal be used to secure the MBB in the JBC.)

The JBCs printer tape is a standard product, similar to that used in cash registers and adding machines. Replacement of the tape is a simple process, and poll workers are trained in the steps required.

An important advantage of the eSlate System's architecture is that Poll Workers or voters are not required to handle any expensive smart cards, "electronic keys," or other programmable devices. Therefore, the eSlate does not contain a breach in the system's security, providing access for creative hackers or others seeking to tamper, subvert, or vandalize the system or the election. The Access Code is issued on a piece of printer tape that can act as a receipt or can be disposed of



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after voting. The Poll Workers do not need to be on the lookout for voters forgetting to return smart cards or other activation devices.

19.0 PRECINCT VOTING

19.1 Requirements

- a. The proposed system shall have the ability to incorporate minimal, easy-to-follow on-screen instructions on the ballot for the voter.**

Hart InterCivic Response

When a voter presses the help button once, simple instructions appear on-screen. Pressing the button twice causes a status light to blink on the JBC and prompts the Election Official to send a Poll Worker to assist the voter.

- b. Voting choices shall be clear to the voter.**

Hart InterCivic Response

Contests are clearly and legibly presented, and eSlate's PrecisionVote design leaves no doubt as to which selection the voter is making. This is the case because the blue highlight bar distinctly illuminates the voters intended selection.

- c. Voter shall be allowed to review all voting choices before casting the ballot.**

Hart InterCivic Response

The voter moves freely through the ballot and may review all contests before casting his or her ballot. The voter cannot complete voting until he or she has seen the Ballot Summary Screen, which lists selections made and alerts the voter to contests where no selection was made.

- d. Voter shall be allowed to change selection(s) at any time prior to the final casting of a ballot.**

Hart InterCivic Response

Voters may change selections at any time until the CAST VOTE button is pressed when the voter is viewing the last page of the Summary Screen.

- e. Vendor shall provide a means to demonstrate the operation of the devices to the voters.**

Hart InterCivic Response

Hart makes available various tools for voter instruction and demonstration. Options are presented below in *Exhibit IV-16: Voter Instruction Materials*.



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- f. Voters shall be warned and acknowledge that s/he has failed to completely vote a contest or measure (i.e., under-voted).

Hart InterCivic Response

The eSlate's Ballot Summary clearly indicates "No Selection" in every contest where the voter does not make a choice. Then the voter has the option to return to the contest and make a selection.

19.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Describe how on-screen instructions can be provided.

Hart InterCivic Response

Each voting unit has a HELP button that, when pressed by the voter, presents on-screen (and audio on the DAU) context-sensitive help specific to the particular stage of the voting process. If needed, the voter may summon poll worker assistance by following the instructions directing him or her to press HELP a second time. This action will first inform the voter that assistance is coming and then informs the election official that the voter requires assistance through the indicator on the JBC that flashes red and green.

- (2) Describe how the voter will make voting choices. Include all steps, including the review of the ballot choices and how the voter can make changes to choices or correct under-voted contests or races. The proposed system should require conformation from the voter of their choice to under-vote. Include samples of the ballot screens.

Hart InterCivic Response

Voting on the eSlate is simple. When confirmed as a qualified voter, the voter is assigned an Access Code, which is printed by the Judge's Booth Controller. The Access Code is a randomly generated four-digit number that is linked to the correct ballot style for the voter. ***The Access Code cannot be linked to the voter's identity in any way.*** (The Access Code is also displayed on the JBC screen in the event of a printer malfunction.)

The voter may go to any open eSlate Booth. The voter selects a language by turning the SELECT Wheel and pressing the ENTER button, and is then presented with an image of a number pad on the screen. Using the SELECT wheel and the ENTER button, the voter enters the four digit access code, which



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instructs the eSlate System which ballot to present to the voter. The ballot is then presented on the eSlate's full color SVGA screen.

Once the Access Code is entered, ballot navigation is accomplished with the SELECT Wheel. The ENTER button is used to record voter choices. As the voter rotates the SELECT Wheel, the text on the ballot is highlighted, and the voter records his or her selection by pressing ENTER. Video material showing the operation of the eSlate is included with the *Attachment 7: Voter Instruction Materials*.

The eSlate does not accept a CAST BALLOT command until the voter has viewed the Ballot Summary. The voter may view the Ballot Summary by voting the last contest on the last page of the ballot, by pressing NEXT after viewing the last page of the ballot, or by pressing CAST BALLOT the first time before having completed either of the above.

Upon entering the Ballot Summary, the voter is presented with a review of his or her ballot selections, including contests in which the voter has made no selection (which is to say, he or she has undervoted). The Ballot Summary clearly identifies any undervoted contest by marking it "No Selection" in red type. For voters using the audio ballot, each contest name is read and any undervotes are identified as "No Selection."

The voter is free at any point to select a contest in which he or she wishes to change a selection. By not returning to correct a "No Selection" contest, the voter confirms his or her choice to undervote.

Returning directly from the Ballot Summary to a specific contest or proposition is accomplished simply by scrolling the SELECT wheel to highlight the desired contest and then pressing ENTER. This action takes the voter directly to the selected contest to make any desired change. Using the SELECT Wheel, NEXT, and PREV, the voter may also navigate freely backward and forward through the ballot to change or review any selection at will.

When the voter is finished making his or her selections, he or she presses the CAST BALLOT button. The ballot is recorded electronically as a Cast Vote Record.

Throughout the voting process, the voter has multiple opportunities to change a vote on the eSlate System. In fact, the voter may change selections at will until the ballot is cast. Furthermore, the voter must view the Ballot Summary before a final ballot can be cast.

Sample eSlate Ballot Screens are included in *Attachment 8: DRE eSlate Ballot Screens*.

c. How do you propose the operation of the voting devices would be demonstrated to the voters?



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Hart InterCivic Response

Every aspect of the eSlate System has been designed to be user friendly and to provide maximum guidance to voters on the operation of each component.

Hart InterCivic provides voters a variety of multimedia instructional tools so that they may use all eSlate components accurately and with absolute confidence.

Examples of these materials are listed in *Exhibit IV-16, Voter Instruction Materials*. Please refer to *Attachment 7: Voter Instruction Materials*, contained in the separately bound volume, for samples of these print materials.

Item	Description
Flyers	These flyers are printed on paper and handed out, one to each voter as they arrive at the polls. They contain the same steps as the voter instruction placards.
Placards	These placards are placed in the eSlate booth. They include the same steps as the voter instruction flyers. They may be laminated for preservation.
Flag Placards	These placards are placed in the eSlate booth and contain a reminder to press CAST BALLOT until the voter sees the waving American flag.
Instruction Scripts	These scripts are printed on paper with a picture of the eSlate on one side, and a voter instruction script on the opposite side. Poll Workers may use the script when giving voter instructions.
Video (optional)	This video may be played on any TV/VCR combination. It walks voters through voting on the eSlate System.
Computer slideshow presentation (optional)	This presentation may be run on any computer with Microsoft PowerPoint. It loops continuously and walks voters through voting on the eSlate System.
Demo eSlates	Hart InterCivic offers a demonstration eSlate that can be placed at the polling location. The demo eSlate is not an operating unit, but is identical in look and feel to the eSlate voting device. The demo unit allows a voter to understand the placement of controls and, in conjunction with simple instructions, prepare for the actual use of the unit in the voting booth.

Exhibit IV-16: Voter Instruction Materials. Hart provides voter instruction materials in a variety of media.

Each voting unit also has a HELP button that, when pressed by the voter, presents on-screen (or audio) context-sensitive help specific to the particular stage of the voting process. If needed, the voter may summon poll worker assistance by following the instructions directing him or her to press HELP a second time. This action causes an indicator on the JBC to flash red and green, thus notifying the polling place official that the voter in the specified booth has requested assistance.



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Hart InterCivic is also completing development of a functional eSlate demonstrator unit that can be used at the polling place or in public demonstrations.

20.0 PRECINCT VOTING (PHYSICAL REQUIREMENTS)

20.1 Requirements

- a. The proposed system could be used in some polling locations that are dark, damp, and open to the elements, and that may have limited electrical outlets. The proposed system shall be able to operate accurately and correctly in these conditions.

Hart InterCivic Response

The eSlate System can be, and has been, successfully operated under extremely adverse conditions.

JBC and eSlate units are engineered and built to strict ISO 9001 quality standards. Where eSlate's software solution components are designed for "command and control" functions that assure correct election programming, the polling place-deployed hardware has been engineered for the "front line" to be rugged and reliable in the trenches on Election Day. Extensive testing has demonstrated eSlate's durability, even under harsh environmental conditions.

The eSlate's Rotary Optical Encoder is not affected by high humidity, or even liquid spilled directly on the device. The system is engineered to military specifications for ruggedness. A strong validation of the durability of the eSlate System in damp environments is a recently concluded Salt Fog test which clearly demonstrated the system's durability in harsh damp environments.

Only one electrical outlet is used for the system, and the entire string of eSlate devices can be activated from battery power if necessary, enabling it to operate in a polling place without AC power.

- b. The proposed system shall be capable of sustaining voting activity with back-up power for a minimum of 3 hours under constant use, or provide an alternative solution.

Hart InterCivic Response

Backup power is provided through a battery pack that holds eight standard D-Cell batteries. The alkaline D-Cells provide a high level of power, lasting up to 18 hours, and do not require special storage or recharging when in the warehouse.

- c. The arrangement of the system components at the polls shall not create hazards for the poll workers and voters.



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Hart InterCivic Response

With only one (1) electrical outlet required, polling place hazards caused by electrical wires and cables are minimized. Because the JBC is connected to each eSlate, there are no smart cards or electronic key devices for voters to operate or Poll Workers to collect after the voting process, eliminating a key point of failure or potential security weakness. *There is no requirement for additional Poll Workers to initialize the voting unit for each and every individual voter, resulting in significant cost savings and eliminating a potential obstacle to poll worker recruiting.*

20.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

(1) Describe the requirements necessary for optimum operation of the system in a polling place, including open garages (e.g., temperature, humidity, and ambient lighting).

Hart InterCivic Response

The eSlate System can operate optimally in all conditions, including open garages. The environmental standards for each component of the eSlate System are detailed in *Exhibit IV-17: eSlate Environmental Standards*.



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eSLATE ENVIRONMENTAL STANDARDS			
Components & Peripheral Equipment	Specifications	Operating	Storage & Transportation
eSlate 3000	Temperature	40 – 100 degrees F	-15 to 150 degrees F
	Humidity	0 – 95 percent relative humidity, non-condensing	Per MIL-STD-810
	Vibration	Per MIL-STD-810	Per MIL-STD-810
	Drop Height	Per MIL-STD-810	Per MIL-STD-810
	Power Requirement	120 VAC, 60Hz; Fuse – 250V, 2A	N/A
DAU 5000	Temperature	40 – 100 degrees F	-15 to 150 degrees F
	Humidity	0 – 95 percent relative humidity, non-condensing	Per MIL-STD-810
	Vibration	Per MIL-STD-810	Per MIL-STD-810
	Drop Height	Per MIL-STD-810	Per MIL-STD-810
	Power Requirement	120 VAC, 60Hz; Fuse – 250V, 2A	N/A
JBC 1000	Temperature	40 – 100 degrees F	-15 to 150 degrees F
	Humidity	0 – 95 percent relative humidity, non-condensing	Per MIL-STD-810E
	Vibration	Per MIL-STD-810	Per MIL-STD-810
	Drop Height	Per MIL-STD-810	Per MIL-STD-810
	Power Requirement	120 VAC, 60Hz; Fuse – 250V, 2A	N/A

Exhibit IV-17: eSlate Environmental Standards. Unlike competitors' systems, the eSlate can operate optimally in all conditions, and can be stored in a warehouse with no special power or environmental accommodations.

Hart InterCivic has performed aggressive tests, subjecting the equipment to environmental conditions that ultimately test the equipment to the point of failure. This type of testing, called Highly Accelerated Life Testing (HALT), is used to verify a rugged design and precipitate conditions that result in latent equipment failures in the field. Environmental test conditions used include extreme temperatures, rapid rates of temperature change, and vibration all occurring



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simultaneously. If a product incorporates the results of such tests in its design and construction, the result is a greatly reduced occurrence of field failures and a longer product life.

Results from HALT testing show that the eSlate System is able to operate within a temperature range of -85°F to 158°F and to withstand thermal transition rates of 140°F per minute. Drawing upon results of these tests, improvements have been incorporated into the eSlate System to increase the reliability and decrease the occurrence of field failure rates. The System has even passed all functionality tests after a simulated of storage for 12 years in a high saline humid environment with no climate controls.

The eSlate LCD is illuminated by a backlight, minimizing the requirement for additional lighting.

- (2) Describe the physical requirements for a polling location, including but not limited to electrical outlet requirements for amperage, dedication of circuit, electrical draw of equipment for up to an eight-station voting arrangement, including any ancillary equipment.**

Hart InterCivic Response

Polling place operations require just one AC outlet for the operation of the eSlates, DAUs, and JBCs, and the system can be activated on battery power if required. The electrical draw of the eSlate equipment for a voting arrangement that has eight stations (for example) does not exceed 2.5 amps.

Similarly, remote collection sites need only an AC outlet to power the equipment (such as a PC) used in reading or receiving the cast vote information.

- (3) Describe the recommended arrangement of check-in table, booths, the path of travel for voters, and placement of electrical cords and connections, and how these are secured to allow maximum safety for voters and poll workers.**

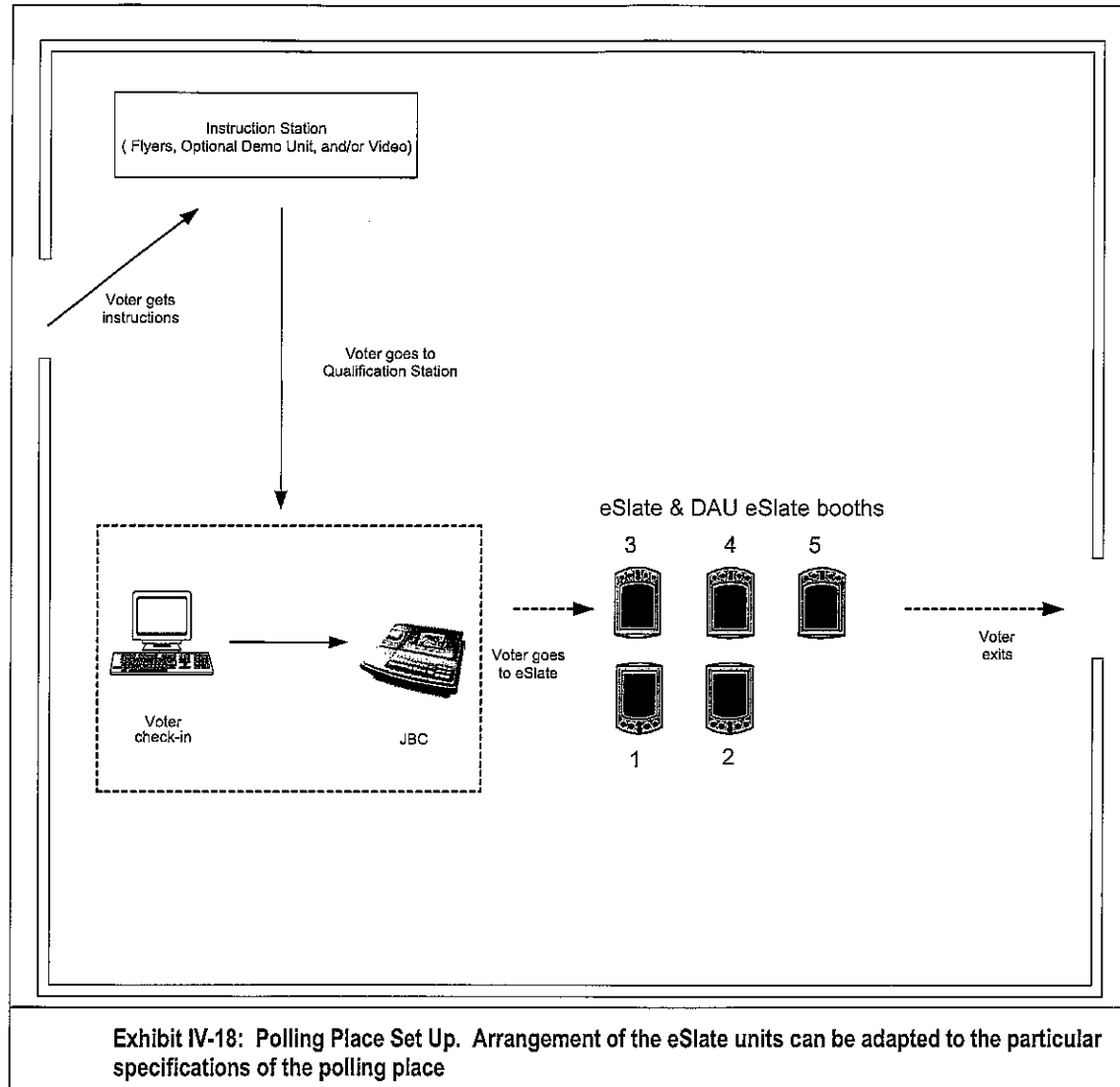
Hart InterCivic Response

The eSlate Polling Place Operations Course covers all facets of processing voters, including: planning furniture and utilities placement for the functional flow of traffic in the polling place, handing out Access Codes, assigning booths, processing provisional ballots, canceling booths, checking voter Access Codes, aiding voters who require curbside voting assistance, and safety concerns.

Exhibit IV-18: Polling Place Set Up provides one option for polling place set up assuming a single JBC and 5 eSlates.



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(4) Describe the procedure for transitioning the voting devices from AC to backup power supply if a power outage occurs.

Hart InterCivic Response

If a power outage occurs, units with battery packs installed (including the JBC) can continue to operate without interruption or degradation of performance. Backup power is activated immediately and automatically, with no perceptible impact. Power is not required to store and retain a vote. Each eSlate polling place



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component may be equipped with a battery pack that can power the unit for more than 18 hours.

The eSlate's architecture also provides unmatched data security to protect cast votes in the event of a power failure. When the voter casts his or her ballot, the Cast Vote Record is immediately stored in non-volatile flash memory in three physically separate locations: the eSlate unit on which the vote is being cast, the JBC, and the MBB. Non-volatile memory does not require continuous power to retain data. Consequently, in the event of any type of power failure, the redundancy and engineering of the eSlate System assures that all CVRs are safely recorded and NO data is lost.

Units without battery packs installed will cease to function, will NOT lose any data, and will allow data to pass through them to/from units that remain operational. Normal voting operations may continue with the battery equipped units until power is restored, and additional units may be brought on-line as they are equipped with battery packs.

The procedure to bring all units back on-line following a power outage, or to bring additional battery powered units on-line while external power is still off, is simply to shut the system down, re-apply power, re-assign the booths, and resume operations. The procedure should take less than one minute to accomplish.

In the case of complete power failure (no external or battery power available), the system will cease to function immediately but NO data will be lost. As soon as power is re-applied (either regular external power or battery power), the system is activated automatically. It may be returned to normal operation by simply re-assigning the booths, as described above.

21.0 BALLOT TABULATION (HARDWARE AND SOFTWARE ENVIRONMENT /SECURITY)

The Boulder County Clerk & Recorder operates in a Microsoft Windows NT/2000 server network environment.

21.1 Requirements

- a. The vendor shall provide all hardware and software necessary to conduct elections and ensure a secure environment, both physical and logical.**

Hart InterCivic Response

The hardware and software required to conduct and ensure a secure environment, both physical and logical, is provided in this response.

The eSlate tabulation system (Tally) operates in closed, Windows NT/2000 configuration to provide a secure physical and logical environment. Data input into this closed tabulation system is only through reading the MBBs. Output data



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from the closed tabulation system is only through printed reports, exported files and databases written to floppy disks or CD-ROMs.

The settings for OS are configured at installation. The configuration can be modified during the installation process according to County requirements if necessary.

- b. The proposed system shall interface with the Microsoft Windows network and operate seamlessly within this environment for all vote tabulation activities.**

Hart InterCivic Response

All data and applications are Windows NT or 2000 compatible. However, the eSlate System does not transmit data within an external network environment, therefore providing the highest level of security. This configuration keeps the entire election system completely secure from outside intrusion. Since the election system is not connected to outside networks, attacks cannot be made from these outside networks to the eSlate System.

If a configuration requires a direct electronic transmission capability, it is provided by a one-way data link that only allows data to be transmitted out of the eSlate System.

- c. The proposed system shall move and store data from the DREs and absentee/mail/provisional ballot system, interfacing with Windows NT operating system software. Data being moved between components will be protected using industry standard encryption.**

Hart InterCivic Response

The closed nature of the eSlate system does not require the use of published encryption methods.

- d. All software used to move results shall generate logs reporting all unexpected error conditions, movement of vote totals, log data and operator activity occurring during any time votes are accumulated at the central count point.**

Hart InterCivic Response

An audit trail is maintained of all data movement. In addition, a real time audit log is continuously printed during the tabulation process.

21.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

(1) Provide a diagram of a proposed hardware configuration to handle the vote tabulation of 250 voting precincts, with 1250 devices reporting results to a central count site. To keep it simple, you can assume that the Boulder County Clerk & Recorder will not transmit votes from any of the voting precincts electronically and will use no remote site counting. Votes will be counted at a central location. Vote data will arrive at the central count location at a rate of 70 (formerly 300*) precincts per hour, with a peak of 150 (formerly 900*) precincts for a one-hour period. Precincts will begin arriving at approximately 7:30 pm, with all precincts in-house by 11 p.m. Mountain Time. The last precinct received will be processed no later than 11:10 p.m. Mountain Time.

***NOTE:** Per Addendum 1, this item is changed to state the need to process an average of 70 precincts per hour, with a peak of 150 per hour.

Hart InterCivic Response

Exhibit IV-19: Boulder Voting System Hardware Configuration shows the configuration designed to handle the tabulation of more than 250 precincts in the prescribed amount of time. The configuration is based on the assumptions provided in the RFP, which were modified following analysis of the information.

The assumptions provided allow 3.5 hours to process 250 voting precincts. We assumed that there is one MBB for each precinct. The configuration must be designed for the peak load of 170 voting precincts per hour.

The timeframe of 3.5 hours will permit processing of far more than the estimated 250 Election Day precinct MBBs.

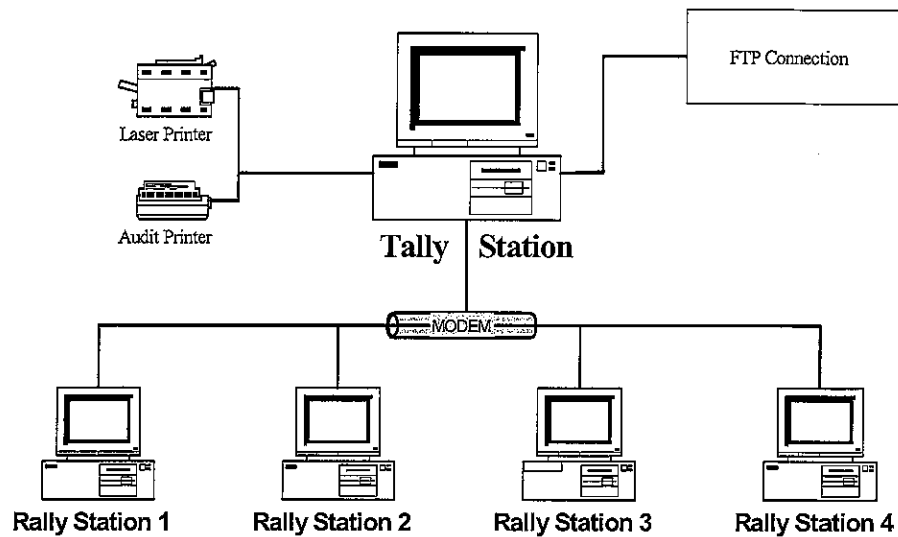
The hardware and software are not the limiting parameter when establishing a configuration with sufficient capacity to handle the peak load. Instead, human factors determine the amount of time required to process all of the voting precincts.



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Configuration Diagram



Mobile Ballot Box Delivery

# of MBBs	Time
70	8:30 to 9:30
170	9:30 to 10:30
10	10:30 to 11:00
250	total MBBs (1 per precinct)

Assume 5 seconds to process an MBB (2 sec to read,
3 seconds to insert and remove). Design for peak load.

170 MBB/hour arrival rate at peak
14 Minutes required for processing

Exhibit VI-19: Boulder Voting System Hardware Configuration. The diagram above shows the configuration designed to handle the tabulation of 250 precincts in the prescribed amount of time.



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- (2) Provide a detailed description of all security protocols used when transmitting data within a network environment. Also, provide recommendations to secure your proposed system within a County Wide Area Network (WAN). This should include domain accounts, SQL security if applicable, firewall software, etc.

Hart InterCivic Response

The eSlate System does not transmit data within an external network environment, therefore, providing the highest level of security.

All eSlate Election Management components are non-networked, including ballot definition (BOSS), ballot presentation (eSlates, Ballot Now), and ballot tabulation (Tally) systems. Data transfer is accomplished by the physical transfer of the eSlate Mobile Ballot Box (MBB). The remote transfer (Rally) stations connected to the ballot tabulation systems (Tally) are mutually connected via a physically secure private network, which is not connected to outside networks.

This configuration keeps the entire election system completely secure from outside intrusion. Since the election system is not connected to outside networks, attacks cannot be made from these outside networks to the eSlate System.

22.0 BALLOT TABULATION (SETUP)

22.1 Requirements

- a. As noted in requirements in the Ballot Management (Automated Ballot Layout) section, all setup of the vote tabulation program shall be accomplished automatically through the Automated Ballot Layout software.

Hart InterCivic Response

All setup takes place through BOSS, the eSlate System's automated ballot layout software.

As noted previously, BOSS is a powerful election database application that manages jurisdiction data and election-specific information – districts, contests, candidates, and ballot styles – necessary for conducting the election. BOSS provides the ability to easily format ballots and distribute the formatted ballots to the voting devices. All data entry is conducted through BOSS, either manually or through the import capabilities of BOSS. The BOSS database powers the Ballot Now absentee/mail/provisional voting software and initializes the Tally tabulation and reporting software for both the polling place and absentee/mail/provisional voting systems.



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- b. Manual entry shall be allowed for special races such as recall contests. It is also expected that manual setup will be necessary for election specific parameters.**

Hart InterCivic Response

BOSS supports manual entry of data, including special races, and manual setup of election specific parameters.

- c. The software shall allow for variations of the ballot titles that will appear on the election night results reports, the statement of vote and the voting pages of the sample ballot pamphlets. In other words, the titles could be worded differently on each.**

Hart InterCivic Response

Variations of the ballot titles that will appear on the Election Night results reports, the statement of vote, and the voting pages of the sample ballot pamphlets can be accommodated. The system also allows for manual changes to the contest titles in the election results reporting files to cascade throughout all vote reporting export files.

- d. The software shall allow for manual changes to the contest titles in the election results reporting files. These shall cascade throughout all vote reporting export files.**

Per Addendum 1, the intent is to address last minute ballot corrections or changes.

Hart InterCivic Response

The eSlate System provides the flexibility to accommodate last minute ballot changes quickly and efficiently. The key factors supporting this flexibility include:

- Every MBB contains all ballot styles for the election;
- Every MBB is universally assignable to any precinct or polling location; and
- Individual voting machines do not have to be re-programmed to smoothly incorporate ballot changes.

If the BOSS database has not been locked, changes are made globally by editing data fields, including contest titles. Changes are applied to all ballot types linked to the data that has been changed. If the BOSS database has been locked, the election official can copy the existing BOSS database and create a new election database in which to make the necessary changes. This process takes one to two minutes and retains a copy of the incorrect database for the election record.



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Polling Place Voting. eSlate requires that only one MBB be written for each polling location. This greatly reduces the effort needed to program and distribute equipment. Other systems may need a precinct specific card for each voting unit, requiring election officials to address the programming of 1,250 stand alone units.

Absentee Voting. In the Ballot Now absentee system, the process to incorporate last minute changes is the same, since Ballot Now uses the same database, ballot format, and MBB that is generated by BOSS. Thus, the system may begin immediately to print ballots with the revised ballot information

Variations in contest titles can also be managed through specialized reporting developed with Crystal Reports.

- e. **The software shall allow for adding a race or candidate without affecting the initial layout, edits and testing.**

Hart InterCivic Response

Through BOSS, races or candidates can be added without affecting the initial layout, edits, and testing. BOSS allows for manual editing of the ballot without affecting the initial style and is capable of printing numerous variations of vote reports and other information reflecting the ballot titles/styles. When any data element is changed, the change is automatically and globally carried to all ballot types, reports, contests, districts, voting locations, precincts, or other data element linked to the data that has been changed.

22.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Describe each element that is transferred from the ABL to the tabulation software and list whether manual changes are allowed to that field, e.g., contest name, proposition title or text, candidate name, occupation, vote for, etc.

Hart InterCivic Response

All data fields resident in the BOSS application are transferred to the Tally application. This includes:

- election
- equipment
- party



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- polling places
- precinct
- contest
- proposition title and text
- candidate names
- polling place and precinct associations
- contest and precinct associations

All data elements can be edited manually. Editing occurs while in BOSS. When any data element is changed, the change is automatically and globally carried to all ballot types, reports, contests, districts, voting locations, precincts, or other data element linked to the data that has been changed.

Tally does not permit editing election data, which maintains and ensures the integrity of the data. If specialized reports are required (with special headings, race titles, etc.) this is achieved through Crystal Reports, eSlate's integrated custom report writing tool.

23.0 BALLOT TABULATION

Currently, election night results are reported by election precincts (polls); declared absentee precincts; and requested absentee precincts. Election precincts and declared absentee precincts are maintained in the Election Management System; requested absentee precincts are not maintained in the system.

Per Addendum 1, "declared absentee" precincts and voters is changed to "Federal Ballot" precincts and voters.

23.1 Requirements

- a. **The proposed system shall be capable of tabulating and reporting separate results by the following categories: polls voters, Federal Ballot (formerly declared absentee) precincts and voters, requested absentee voters, and early voters.**

Hart InterCivic Response

Standard eSlate reports identify the ballot option by categories that include Early Voting, Election Day, and Absentee. Boulder County can easily identify a specific precinct to manage ballots for accumulating results for the Federal Ballot category.

Federal ballots and voters can be accommodated on the eSlate System either by (1) creating a special Federal Ballot precinct or (2) using Ballot Now to create paper ballots for Federal Ballot voters. Through either approach, Federal Ballot votes can be separately tabulated and reported.



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- b. The proposed system shall be capable of supporting the following schemes of reporting requested absentee results: ballots shall be tabulated and reported by the voter's ballot type or in a precinct corresponding to the voter's polls precinct.

Hart InterCivic Response

Each Ballot Now ballot includes a bar code that identifies the precinct and/or ballot style. This eliminates the need to sort ballots before scanning, which eases the workload for the Elections Staff and speeds ballot processing.

Results are reported through Tally, the eSlate System's fully integrated tabulation and reporting application. Results are reported by precinct, showing separate totals for Election Day, Early Voting in Person, and absentee/mail, as well as consolidated results. Results can also be reported by ballot type.

- c. The proposed tabulation system shall create the necessary precincts for accumulating and reporting results for requested absentee ballots. The County should have the option of identifying these precincts by number and description, requiring no manual keying.

Hart InterCivic Response

Precincts are created in BOSS (from data supplied from Integrity or manually created) and automatically flow through the system. The naming convention must be selected at this stage of election preparation and may be alpha or numeric references. Precinct names are not re-keyed for tabulation.

23.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Using a flow chart, identify all possible ballot origination points in your vote tabulation system. Identify the direction the ballot can take after it is cast and in which type of precincts the results might be accumulated. Include DRE and absentee/mail/provisional ballot.

Hart InterCivic Response

Exhibit IV-20, Hart InterCivic eSlate Electronic Voting System Workflow, presents the ballot origination and subsequent workflow through the voting and tabulation process.



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24.0 BALLOT TABULATION (STATISTICAL STATEMENTS)

24.1 Requirements

- a. The vote tabulation program shall allow for the automated import of election precincts, districts, and voter totals data used to report election results. This data includes number of precincts and number of registered voters eligible to vote in contests and in political jurisdictions, and the overall totals for the county. The precinct totals are set early in the process and are not changed after the initial load. The voter totals are captured at different times throughout the election cycle: 60 days before, 29 days before, and 15 days before the election. For the initial testing, totals from 29 days before the election will be displayed.

Hart InterCivic Response

Election data is entered and managed through BOSS. As indicated previously, data can be readily imported into BOSS. Voter totals can be imported at the specified times during the election cycle.

- b. The system shall allow for the update of the voter registration totals from 15 days before the election without affecting any of the contest and candidate information that has been certified through the logic and accuracy testing prior to 15 days before the election.

Hart InterCivic Response

Hart InterCivic will provide a mechanism that will support the update of voter registration so they are current as of 15 days before the election.

- c. The vote reporting system shall display precincts counted against total precincts for a contest, political jurisdiction and overall totals for the county.

Hart InterCivic Response

Tally has a number of standard reports with the cumulative result reporting the number of precincts counted versus the total number of precincts.

- d. The vote reporting system must have a way to automatically combine results from optical scan absentee ballots with electronic results from DRE machines, so that a single final result is reported for each race.



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Hart InterCivic Response

The eSlate System is fully integrated, so that results from the Ballot Now application are automatically combined with results from the eSlate DRE units in Early Voting or Election Day polling places.

- e. The Boulder County Clerk & Recorder also reports ballots cast vs. registration for each contest and jurisdiction on the ballot, in order to calculate voter turnout. We would like the option of generating an additional summary page at the end of the results report for selected contests, political jurisdictions and overall totals for the county. These statistics should be made available in all reports and exports, including web pages.

Hart InterCivic Response

Through Crystal Reports, the industry's leading custom reporting tool, reports can be developed to meet Boulder County's specifications. Definition of specialized reporting requirements is one of the activities in the initial Work Process Analysis (WPA), the first activity in the project execution plan. Following the WPA, Hart will develop the template for the additional summary page and integrate it as a standard report in the Boulder County System.

24.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Does your system currently support ballots cast vs. registration reporting? If the system currently does not support the ballots cast vs. registration reporting, could it be incorporated into your current software? Describe how and when this could be accomplished.

Hart InterCivic Response

The Hart InterCivic system currently supports ballots cast versus registration reporting. The number of registered voters in each precinct is entered (or imported) through BOSS, and the data is carried through to the tabulation process. Tally's standard reports provide formats that include the percentage of registered voters that voted, by precinct.



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- (1) Provide samples of existing printed results reports; web pages; export files showing contest information; candidates; vote totals; etc.; and precincts reporting and ballots cast information, if supported.

Hart InterCivic Response

Samples of eSlate System reports are included as *Attachment 2: eSlate System Reports*.

25.0 BALLOT TABULATION (SECRETARY OF STATE BPS REPORTING)

The Secretary of State requires counties to report election results through their BPS system. County vote totals are accumulated by the system for the issuance of statewide results.

25.1 Requirements

- a. The vote tabulation program shall support all existing and future automated reporting options used to report vote totals to the Secretary of State.

Hart InterCivic Response

Hart InterCivic acknowledges and will meet this requirement.

- b. The proposed software shall be certified by the Secretary of State prior to being allowed to participate in automated reporting on election night.

Hart InterCivic Response

The reporting functionality will be certified by the Secretary of State prior to Election Night as a component of the tabulation system.

- c. The proposed system shall automatically generate results using the Secretary of State template files for election night reporting, Statement of Vote and Supplement of the Statement of Vote, with no manual editing of the output files.

Hart InterCivic Response

This requirement will be met. See discussions below.

- d. The system shall also support File Transfer Protocol to move these files directly to BPS at timed five minutes intervals.

Hart InterCivic Response

This functionality is extensible and configurable to support future automated reporting requirements and supports scheduled tasks to allow automated File



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Transfer Protocol transmission through a firewall to the Colorado Secretary of State.

e. The File Transfer Protocol shall support a firewall connection.

Hart InterCivic Response

This requirement will be met. See discussions below.

f. The system shall support scheduled tasks to allow automated File Transfer Protocol transmission to the BPS results site.

Hart InterCivic Response

This requirement will be met. See discussions below.

g. The system shall have a mechanism for entering the write-in candidates vote totals and the voter registration totals associated with the valid contest for the Statement of Vote and Supplemental Statement of Vote templates.

Hart InterCivic Response

The write-in candidate vote totals will be supplied electronically from Tally to be included in the Statement of Vote and Supplemental Statement of Vote templates. Write-in candidate data and voter registration information is already contained in the results data passed from the tabulation function.

25.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

(1) Has your software been used to report results to the Colorado Secretary of State's automated report process or to a similar report process? Indicate each election and the county. Identify which of the Secretary of State's formats you have successfully generated and for which county.

Hart InterCivic Response

The eSlate System will support reporting results to the Colorado Secretary of State's automated report process. This system has not yet been used to report results to the Colorado Secretary of State's automated report process. Hart does, however, have experience with such a process in the State of Texas for reporting to a State level system in a pre-defined template.



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The Hart system can support scheduled reporting to the Secretary of State on any frequency including real-time updates of results. Hart has implemented a reporting utility in another jurisdiction (Tarrant County), called Press that outputs a continuous update of results from the tabulation system. The frequency of these updates can be set to any desired time interval to support reporting requirements for the Colorado secretary of state. For security concerns, it is necessary for these tasks to be performed on a separate machine that is connected to the tabulation system through a one-way secure data link.

The requirement for regular, automatic reporting is provided through the Tally Uplink capability. The Tally Uplink process runs continuously on the same computer client as the Tally application. Tally Uplink can be configured to access Tally report generation on a scheduled basis without interrupting other Tally processing. If Tally Uplink finds a new or updated County election report, it will transfer that report automatically and instantaneously from the Tally application computer. This is done via a one-way data link that allows programmatic output from the Tally application computer, while still maintaining a non-networked security status.

The computer on the other side of the one-way data link is running the Tally Uplink companion. This computer automatically receives the new or updated Tally report and uploads it to the Internet at a County-specified location.

- (2) If your system has not been used to report results to the Colorado Secretary of State's automated report process, please describe how you will accomplish this.**

Hart InterCivic Response

See the discussion in the previous response.

- (3) Is the File Transfer Protocol client local or external to the vote tabulation program?**

Hart InterCivic Response

Our FTP client program is external to our tabulation system.

- (4) Does your system support scheduled jobs for executing scheduled tasks (e.g., reporting to the Secretary of State)? If so, how many jobs can be scheduled while the vote accumulation is taking place. Can these scheduled jobs reside on a machine other than the main vote tabulation system?**



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Hart InterCivic Response

The requirement for regular, automatic reporting is provided through the Tally Uplink capability. The Tally Uplink process runs continuously on the same computer client as the Tally application. Tally Uplink can be configured to access Tally report generation on a scheduled basis without interrupting other Tally processing. If Tally Uplink finds a new or updated County election report, it will transfer that report automatically and instantaneously from the Tally application computer. This is done via a one-way data link that allows programmatic output from the Tally application computer, while still maintaining a non-networked security status.

The computer on the other side of the one-way data link is running the Tally Uplink companion. This computer automatically receives the new or updated Tally report and uploads it to the Internet at a County-specified location.

26.0 BALLOT TABULATION (VOTE SIMULATION)

The Boulder County Clerk & Recorder is required to simulate ballots cast and votes that represent predetermined results. Test decks of ballots are created with voted contests, which are then hand tallied and compared to the results shown by the ballot counting program. This allows us to assemble a set of test data for testing the accuracy of the ballot counting both before and after each counting session during early voting and on Election Night. This data is also used for testing the Secretary of State's BPS automated reporting certification, and for the simulation of election night vote counts for media results.

Problems are identified when comparing the test deck votes to the votes counted by the ballot counting program, and differences are found.

26.1 Requirements

- a. The vote tabulation system shall be capable of simulating multiple vote patterns against all precincts including absentee/mail/provisional ballot precincts (i.e. one vote per candidate, random votes per candidate or measure for each ballot cast, one vote per contest, increasing votes per candidates, etc). All of the simulations, with the exception of random vote per candidate, will produce predetermined results that can be verified.

Hart InterCivic Response

This requirement will be met. See discussions below.



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- b. The DRE shall have an automated means of voting a set of test ballots with predetermined results. These test ballots shall represent one of the simulations supported in (a).

Hart InterCivic Response

This requirement will be met. See discussions below.

- c. The casting of additional test ballots after (b) is completed should be allowed.

Hart InterCivic Response

The eSlate System permits the casting of additional ballots after test ballots are voted.

26.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Describe in detail the steps you recommend to verify the system is programmed correctly. Include all proofing steps except those conducted during ballot generation.

Hart InterCivic Response

The eSlate System supports a variety of traditional Logic and Accuracy tests to verify the system is programmed correctly. Vote patterns manually entered using a test or election MBB on the eSlate allow the voted information to be returned to Tally for verification of results. This can be performed on a precinct or ballot style basis. The autovote utility is available to execute this process without human intervention.

Hart InterCivic has developed a procedure manual detailing procedures for managing logic and accuracy testing on the eSlate System. A copy of this manual is available upon request.

Hart has developed a vote simulation utility, used to simulate voting on the eSlate System, and will provide this capability to Boulder County. Using an external PC to run the utility, keystroke and wheel turn commands are fed into the polling place closed network to exercise the maximum amount of executable code and ballot data. Voting patterns, number of votes and speed on the process are all controllable parameters from the vote simulation utility. Once a defined vote simulation cycle is complete, additional votes may be cast on the target system.



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- (2) Is the proposed system capable of simulating results acceptable to the Secretary of State using their automated reporting system without manual adjustment to the ballots and votes cast?

Hart InterCivic Response

Yes. The eSlate System is capable of simulating results acceptable to the Secretary of State using their automated reporting system without manual adjustment to the ballots and votes cast.

27.0 BALLOT TABULATION (PROVISIONAL BALLOTS)

At the November 2000 Presidential General Election, 22,431 provisional ballots were voted in Boulder County. Of the total, 17,153 were released into the count by the Monday following Election Day.

The process for managing provisional ballots starts by issuing envelopes to each polling place to act as a return vehicle for the ballot and the voter information. Each of these envelopes contains a serial number that is assigned to the consolidated precinct by the Election Management System. After a voter casts a provisional ballot, he/she fills in information on the back of the provisional envelope, places the ballot in the envelope, seals the envelope and gives it to the precinct worker. The ballots are returned to the Boulder County Clerk & Recorder on election night, where the ballots are accumulated by type, location, and political jurisdiction. Boulder County Clerk & Recorder then reports the number of outstanding ballots at the end of the election night count.

The Election Management System is used to verify the provisional ballots; the serial number located on the provisional ballot plays a critical roll in the adjudication process. The serial number is entered into the failsafe/provisional module to validate the voter to the actual voting precinct and ballot type. All provisional envelopes at a polling location show the same serial number.

27.1 Requirements

- a. The proposed system shall accept a provisional ballot without tabulating or recording the provisional ballot cast when reporting that precinct's totals.

Hart InterCivic Response

The eSlate System can accept a provisional ballot without tabulating or recording the cast ballot when reporting precinct totals. The process for this is explained in 27.1 below.



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- b. The proposed system shall assign a unique number to each provisional ballot voted at a polling place. This number shall allow us to locate the precinct the ballot came from and identify the voter so the ballot can be released.

Hart InterCivic Response

The Ballot Now System prints a serial number/bar code on each ballot which permits the County to identify the precinct. The eSlate System assigns a unique Retrieval Code to each provisional ballot, enabling retrieval of the ballot so a determination can be made. Release of the ballot for tabulation is approved or rejected within the Tally application. Results of approved, released ballots are included in the results reporting.

- c. The proposed system shall provide an automated interface from our Election Management System to the vote tabulation system for releasing these ballots into the count. The interface shall use the number assigned at the time the ballot is cast.

Hart InterCivic Response

As part of the Boulder solution, an interface will be developed for Tally to read an output file from the Election Management System that supplies the results of the adjudicated provisional ballots. Following additional analysis of the adjudication process and the resulting data available from the Election Management System, Hart and the County can define an automated process to support the volume of provisional ballots cast in an election. The analysis and process definition would occur after contract award and the resulting effort included in the signed contract.

27.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
--------------------------------------	-----	---	----

- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Describe how provisional votes are cast. This should include the process for the voter and the poll worker. You should describe how the unique number for the provisional ballot is generated or where you expect the number to come from if the proposed system does not generate it.

Hart InterCivic Response

Ballot Now, eSlate's digital absentee balloting application, is a paper balloting system that is fully integrated with the eSlate Electronic Voting System. Ballot Now manages the printing, scanning, and resolution of paper ballots for absentee



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or provisional voting. Ballot Now also records voted ballots as electronic Cast Vote Records (CVRs) for tabulation through the eSlate Tally tabulation and reporting system.

Under current Colorado law and procedure, provisional voters are handled through paper ballots; the eSlate System meets this requirement through the Ballot Now System. Absentee/mail/provisional ballots, produced through the eSlate System's Ballot Now component are separated from other cast votes and held for scanning, and therefore tabulation, until a determination of eligibility is made.

However, in the event that Colorado permits electronic processing of provisionals, the eSlate includes integrated capability for managing provisional votes.

Tally efficiently handles the processing of provisional ballots. Provisional ballots cast on the eSlate are assigned a random number, or Retrieval Code, used to identify a specific ballot in the Tally application. To process these ballots cast on the eSlate, prior to tabulation, the election official instructs the Tally System to hold provisional votes out of the tally until they are reviewed and resolved. Tally can also accept provisional votes until rejected. This is accomplished through a simple selection box in the application.

Once the provisional ballots have been reviewed and disposition rendered for each, election officials view the list of Retrieval Codes in Tally. The individual Retrieval Code would then be accepted or rejected depending on the disposition. Although the Retrieval Code may be used to identify a specific provisional ballot in the Tally application, there is no access to the actual ballot contents at any time during provisional ballot processing. The Tally application allows Colorado election officials to specify prior to tabulation that the provisional ballots should not automatically be included. Ballots can be accepted into the tabulation if it is later determined that the voter was qualified to vote.

Although the Retrieval Code may be used to identify a specific provisional ballot in the Tally application, there is no access to the actual ballot contents at any time during provisional ballot processing.

The Tally application allows election officials to hold the provisional ballots out of the election tally until they are deemed eligible. (For other States and Counties, Tally can also permit provisional ballots to be "accepted until rejected.")

- (2) Describe the procedure for releasing provisional ballots into the count. This should include the number of workstations that can be used to release provisional ballots and an estimated number of ballots that can be released in one hour on a single workstation.**

The Tally application provides a complete list of Retrieval Codes on-screen, one for each Provisional Ballot. A Tally operator utilizing a list of Retrieval Codes for ballots not to be accepted can "click" on the code number and "click" on the



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Reject button. Depending on the operator, approximately 1500 ballots per hour can be rejected. The remaining Provisional Ballots can be brought into the election results without further processing.

- (3) Describe all reports and file export routines related to provisional ballot status, including ballots pending and ballots released. Indicate what information is available on the reports, such as date, precinct, ballot type, party, etc., and how it can be sorted.**

Hart InterCivic Response

The Provisional Ballots report lists the retrieval codes for the Voter Challenge Stubs issued at election polling places. Voter Challenge Stubs represent challenged, or retrievable, ballots. NOTE: Votes from provisional ballots are included, or not included, in the vote totals of other Tally reports based on the condition set in the Include Provisional Ballots in Totals field of the Tally Options window.

When an election official at the polling place issues a retrievable ballot to a voter whose eligibility to vote was in question, the following things occur:

- A Voter Challenge Stub is printed
- A Retrieval Code is linked to the Voter Code
- The Access Code ticket is printed, or
- The voter is required to print and sign his or her name on the Voter Challenge Stub before he or she is allowed to vote

The Provisional Ballots report shows:

- The retrieval code for the challenged ballot
- The name of the precinct where the challenged ballot was issued
- The status of the provisional ballot
 - **Initial** - not yet processed through the Reject Provisional Ballots window
 - **Accepted** - accepted as a valid ballot through the Reject Provisional Ballots window
 - **Rejected** - the ballot was rejected as not valid through the Reject Provisional Ballots window
- The ID of the MBB that recorded the challenged ballot
- The name of the polling place where the challenged ballot was issued
- The election type origin of the challenged ballot



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- **Early** – the ballot was cast during Early Voting
- **Election** – the ballot was cast during Election Day and
- The total number of provisional ballots read into the Tally System

28.0 BALLOT TABULATION (WRITE-IN CANDIDATES)

28.1 Requirements

- a. The proposed system shall provide a means of recording the selection of candidates for any office whose names do not appear upon the ballot.

Hart InterCivic Response

The eSlate System accommodates write-in voting as an integral part of the electronic voting process. Write-ins are accommodated in both the eSlate DRE and the Ballot Now absentee/mail system. The process is described in response to the questions below.

- b. It shall have the capability for entry of as many names of candidates as the voter is entitled to select for each office.

Hart InterCivic Response

Voters may write-in as many names as the number of permissible selections in the contest.

- c. The proposed system shall be used to cast the vote for the write-in candidate. The voter's precinct, contest and write-in text shall be transferred to the central count computer and stored for later resolution.

Hart InterCivic Response

The eSlate's in-person voting method electronically stores write-in votes. These may be resolved at a later time as determined by County Elections Officials.

- d. During absentee/mail/provisional ballot processing, ballots containing write-in candidates shall be separated from the ballots with no write-in candidates.

Hart InterCivic Response

This is a matter of local procedure, since these ballots do not have to be separated when being processed by Ballot Now. These ballots are identified during the imaging process, and the digital image of the ballot/write-in contest "set aside" in the system to be resolved at a time determined by County Election Officials.

- e. A report containing a list of write-in candidates captured through the proposed system shall be available after the election night count. The report shall contain totals of potential votes for each write-in candidate



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for the contest. These will be unofficial results and shall indicate that on the report heading.

Hart InterCivic Response

Write-in votes are integrated with tabulation reports and included in final summary reports.

- f. There shall be a mechanism for entering the final write-in candidates' votes into the tally system to enable the final summary reports, Statement of Vote, and Supplemental Statement of Vote to contain the write-in votes as required by the Secretary of State.

Hart InterCivic Response

Prior to tabulation, the names and any acceptable aliases for the certified write-in candidates are entered into the Tally application. During tabulation, Tally reads the Cast Vote Records from all MBBs, includes the write-in votes in the tabulation process, and reports write-in votes as candidates. The names of write-in candidates are displayed in reports with the annotation "(W)."

28.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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- b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

- (1) Describe your systems capability for voting, tabulating and reporting write-in candidates for both the DRE and absentee/mail/provisional ballot system.

Hart InterCivic Response

When designing the ballot for a given election in BOSS, the election staff simply selects the appropriate number of write-in options for each contest. This and all other election information is provided to the MBB cards used in the eSlate Precinct Voting System and the Ballot Now and is used to produce the various ballot styles for the election.

At the polling place, the voter viewing the ballot on the eSlate unit then may select "Write-In" when it is presented as an option for a specific contest.

Upon selecting the write-in option, an easy-to-navigate electronic keyboard appears on the screen, and the voter rotates the SELECT wheel to highlight a letter, presses ENTER to record that letter, and repeats the process to spell out the



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name of a write-in candidate. When the write-in process is complete, the voter's ballot reappears with the name he or she entered displayed under the write-in option. Complete audio instructions are provided to voters using the audio ballot instructions.

With Ballot Now, the voter records his or her absentee/mail/provisional write-in votes on the paper ballot. Prior to scanning the ballot in order to tabulate it, the election staff enters the names and acceptable aliases into Ballot Now for certified write-in candidates. After the ballots are scanned, the election staff accepts or rejects the voter's write-in choice according to the list of certified candidates. For "free form" write-ins, a field is displayed that allows the entry of the candidate name as written on the ballot. With this method, all selections, including write-in candidates, are recorded electronically in the Ballot Now system. These records are written to the MBB as CVRs.

Prior to tabulation, the names and any acceptable aliases for the certified write-in candidates are entered into the Tally application. During tabulation, Tally reads the Cast Vote Records from all MBBs, includes the write-in votes in the tabulation process, and reports write-in votes as candidates. The names of write-in candidates are displayed in reports with the annotation "(W)."

Given the recent national attention to elections and election related processes, discussions concerning write-in votes have called for expanded capability. In response to such customer demand, Hart InterCivic will introduce additional capability to handle un-certified write-in candidates in the System 3.0 release. The new functionality will allow Tally to accept unapproved write-in votes and provide a report for review and adjudication prior to tabulation. This will greatly improve efficiency for what is thought to be an increased volume and variability of unannounced candidates for office contests.

29.0 BALLOT TABULATION (RECALL ELECTION CONTEST)

29.1 Requirement

The proposed system shall have the ability to cast and record ballots for both DRE and absentee/mail/provisional ballots in a recall contest as prescribed by the Colorado Elections Code.

Hart InterCivic Response

The eSlate System has the ability to cast and record ballots for both DRE and absentee/mail ballots in a recall contest as prescribed by the Colorado Elections Code.

29.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet this requirement?

Hart InterCivic Response

Section 1-12-112 of the Colorado Election Code requires that the official ballot shall contain a statement consisting of two hundred words or less stating the reasons set forth in the petition for demanding the recall, as well as a statement of justification from the officer being recalled, if that statement is submitted according to the procedure outlined. This additional text is accommodated in BOSS.

The same section also states that ballots for the election of a successor to the officer being recalled shall contain the candidates' names which shall be placed on the ballot by lot, regardless of the method of nomination. This is also supported in BOSS.

Section 1-12-118. of the code states that no vote cast shall be counted for any successor candidate for the office unless the voter also voted for or against the recall. Again, BOSS provides the capability to meet this requirement. The recall question is setup by usual procedures in BOSS as a proposition, with the options of "Yes" and "No." Immediately following the recall question is the office contest that offers the names of successor candidates. An option within BOSS makes the selection of a candidate dependent on voting either "Yes" or "No" on the recall question.

BALLOT TABULATION (SPECIAL VOTING OPTIONS)

30.1 Requirement

The proposed system shall have the ability to cast ballots using all special options prescribed by the Colorado Elections Code, including methods of selecting more than one candidate by casting a single vote (e.g., President and Vice President); other methods for handling cross-voting between parties in open, blanket or unitary primary elections; the "modified" closed primary; and any other pattern of voting authorized by the Elections Code.

30.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet this requirement?



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Hart InterCivic Response

The eSlate System is fully certified by the State of Colorado, and can accommodate the patterns of election voting currently permitted under the Colorado Code. The type of election and specific requirements are defined in BOSS, and ballot styles and election processes are automatically generated through BOSS.

As new or additional voting options are defined for Boulder County, Hart will review the system to determine the best means to address the requirement.

31.0 BALLOT TABULATION (ELECTION NIGHT REPORTING)

The Boulder County Clerk & Recorder releases election results through the use of printed reports showing results for each precinct, and with summary reports showing the combined results for all counted precincts. The Boulder County Clerk & Recorder also creates web pages of up-to-the-minute election results on Election Night for all contests, organized by jurisdiction. The web page results are posted to the Boulder County website every 5 – 10 minutes while precincts are reporting.

The media also asks for key (targeted) precinct results to be printed once the precinct has been counted. Up to 20 precincts are identified as key precincts in a countywide election. The key precinct reports are automatically sent to a pre-determined printer.

31.1 Requirements

- a. The tally system shall allow the flagging of precincts and the automatic generation of precinct reports to a printer designated by the operator for key precinct reporting.

Hart InterCivic Response

Hart InterCivic will implement a reporting process that will flag key precincts and automatically generate and print reports when the precincts are counted.

- b. The tally system shall be capable of manually and automatically generating election results at timed intervals set by the program.

Hart InterCivic Response

Tally supports manually and automatically generating results bulletins that are contained in a single report. The reporting utility will allow the user to generate these reports on demand or input a set time interval for output.

- c. The election results shall support two formats:



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- (1) a standard format showing contest, total precincts to report, precincts counted, percentage of precincts counted, candidate name and votes, and percentage of votes. This report will rank the candidates, with the candidate with the most votes listed at the top and other candidates listed in order by decreasing number of votes.

Hart InterCivic Response

The eSlate System's standard reports include formats that provide all of the data described above. If the current format of standard reports does not meet the County's requirements, we will use the Crystal Reports application to develop custom formats that will be incorporated in to the Boulder County set of standard reports.

During the initial Work Process Analysis, we will produce detailed requirements specifications as to which standard reports meet the requirements, and design and implement custom report solutions through Crystal Reports or other approaches. Hart has substantial experience in the design and implementation of specialized reports that meet customer-specific requirements,

- (2) a duplicate of the report listed above, but which also includes "overvote" and "undervote" totals for each contest.

Hart InterCivic Response

See previous response.

- d. The tally system shall be capable of generating precinct reports displaying the information listed in (c). The Boulder County Clerk & Recorder shall have the option to print this report in either winner ranking order (candidate with most votes first) or base rotation order (candidates in original rotation order).

Hart InterCivic Response

See previous response..

- e. The tally system shall be capable of generating web pages with election results displaying the information listed in (c). The Boulder County Clerk & Recorder shall have the option to print this report in either winner ranking order (candidate with most votes first) or base rotation order (candidates in original rotation order). Web pages generation will be automated to produce current results at a specified time interval controlled by the operator and to post to the County web site. The time interval must be able to be as short as five (5) minutes in length. Results must be able to be separated by jurisdiction onto separate web pages, with a separate turnout shown for each jurisdiction.



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Hart InterCivic Response

See previous response.

Production of reports for posting to the Web is a standard feature of the eSlate System. Specific requirements for the Web reports will be determined during the initial Work Process Analysis.

The Hart system can support scheduled reporting on any frequency including real-time updates of results. Hart has implemented a reporting utility in another jurisdiction (Tarrant County), called Press that outputs a continuous update of results from the tabulation system. The frequency of these updates can be set to any desired time interval to support reporting requirements for the Colorado secretary of state. For security concerns, it is necessary for these tasks to be performed on a separate machine that is connected to the tabulation system through a one-way secure data link.

- f. The tally system shall support file export such as XML or ASCII delimited.**

Hart InterCivic Response

The eSlate System will export files in standard formats such as delimited or XML.

Hart InterCivic is pursuing a strategy of providing a standardized XML import/export interface for the import or export of ballot definition data, and the import and export of election tabulation data. The Hart InterCivic XML Schemas, presently in review and titled "BDX" for Ballot Data eXchange, will provide for the transfer of all election definition, election management, election tabulation and reporting data in a single structure.

Hart InterCivic will provide facilities in all relevant products to import and export data in BDX, and to validate this data. Hart products will be able to accept imports of any election data in BDX format. Modern election products that provide output in XML structures other than BDX can be accommodated easily by developing an XSLT document, which is an XML translation document for converting one XML structure into another.

By using the BDX XML data structure for import and export of data, Hart InterCivic will be able to provide fast, accurate, robust and complete election data integrations between different election products and systems.

- g. The tally system shall support some type of job scheduling at intervals set by the system operator. These shall include all report printing and file export.**



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Hart InterCivic Response

Tally supports manually and automatically generating results bulletins that are contained in a single report. The reporting utility will allow the user generate these reports on demand or input a set time interval for output.

31.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet these requirements? Address all requirements listed above, making sure to include item(s) listed below:

(1) List and describe each report generated by the proposed system. These should include results formats, precinct reports, html, XML, ASCII, etc.

Standard reports for the BOSS, Tally, Ballot Now and SERVO applications are detailed in *Exhibit IV-21: Standard Reports*. All the file types mentioned above (html, XML, ASCII) are presently supported. To meet the County's requirements, all that is required is the format for the file type. Hart's full-time engineering staff is well versed in all popular file structure technologies.

Application	Reports	
BOSS	Active Contest List Active Contest Delegates List Active Contest Options List Audit Trail Ballot Content Proof Contest List Summary Contest List With Details Entire Ballot Slate Equipment List Media Production List	Polling Place List – Absentee Voting - Detail Polling Place List – Absentee Voting - Summary Polling Place List – Early Voting - Detail Polling Place List – Early Voting - Summary Polling Place List – Election Day - Detail Polling Place List – Election Day - Summary and Precinct List
Ballot Now	Audit Trail Certified Write-Ins Election Report Printed Ballots by Precinct	Scan Batch Report Scanned Ballots by Precinct Scanned Ballots by Batch and Unresolved Ballots
Tally	Combined Official Canvass Election Day Precinct Not in Status Final Cumulative Precinct Status Precinct Status With MBB IDs Provisional Ballots	Results Detail Results Summary Summary for All Contests Summary for All Contests by Precinct Summary for All Contests for Public Unreported Polling Places



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Application	Reports	
SERVO	Rejected Write-In Candidates	Write-in Candidates
	Equipment List Backup Devices Device Connectivity Report Device Audit Log	Device Cast Vote Records Report Votes by Precinct Report SERVO Internal Audit Report

Exhibit IV-21: Standard Reports. Each application provides a wide array of standard reports.

In addition to the above reports, all applications are supported by Crystal Reports, an industry standard database-reporting tool that essentially provides our customers with unlimited report formatting capabilities without requiring re-certification of the products.

Hart InterCivic is pursuing a strategy of providing a standardized XML import/export interface for the import or export of ballot definition data, and the import and export of election tabulation data.

(2) Describe how results will be automatically generated for posting on the County web site.

Hart InterCivic Response

The requirement for regular, automatic reporting is provided through the Tally Uplink capability. The Tally Uplink process runs continuously on the same computer client as the Tally application. Tally Uplink can be configured to access Tally report generation on a scheduled basis without interrupting other Tally processing.

If Tally Uplink finds a new or updated County election report, it will transfer that report automatically and instantaneously from the Tally application computer. This is done via a one-way data link that allows programmatic output from the Tally application computer, while still maintaining a non-networked security status. The computer on the other side of the one-way data link is running the Tally Uplink companion. This computer automatically receives the new or updated Tally report and uploads it to the Internet at a County-specified location.

32.0 BALLOT TABULATION (PRECINCT RESULTS)

32.1 Requirement

The software shall generate a statement of vote report that complies with section 15501 of the Colorado Election Code. This report displays vote totals and ballots cast for each reporting precinct, voting district and total votes for each candidate within each contest. The report also displays statistical statements for the breakdown above for registered voters vs. total ballots cast



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and percentage of the vote that each candidate earned. It is important to note that most current tally systems do not provide the percentage of votes cast for each candidate, but this will be a requirement for Boulder County.

Per Addendum 1, this paragraph is amended to delete the reference to section 15501. The software should generate a statement of vote report that complies with the Colorado Election Code.

32.2 Proposer's Response

a. Will you meet these requirements?	Yes	X	No
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b. How do you propose to meet this requirement? Provide a sample page of your statement of vote.

Hart InterCivic Response

The eSlate Tally application includes a standard Statement of Vote report. An example of this is Tally's Summary – All Contests report, a sample of which is included in *Attachment 2: eSlate System Reports*. Similar data is reported in the Final Cumulative and Results Detail reports. As part of the initial Work Process Analysis, Boulder County's requirements for reporting and formatting will be identified, and Hart will then customize standard reports, as appropriate, or create custom reports to meet Boulder County's requirements.

33.0 STORAGE REQUIREMENTS (ENVIRONMENTAL CONDITIONS)

33.1 Requirement

All components will be stored in a warehouse environment. The current warehouse is not climate or dust controlled. All components shall be able to survive these conditions with minimal change to the existing warehouse environment.

Hart InterCivic Response

There are no special storage requirements for the eSlate System. The eSlate extends ease and efficiency beyond the polling place and into the warehouse. eSlate's user-focused engineering and design results in a system that can be stored securely and compactly, without the need for environmental or power modifications, while still allowing easy access for data and inventory management.



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We suggest a clean, orderly, secure storage facility that has adequate space for the preparation of equipment for testing, distribution, maintenance, and other administrative procedures.

Ease of storage is a significant advantage of the eSlate System. The eSlate voting device stores securely in its booth. At the option of the County, while in storage, the booths are neatly secured in a caddy that can also serve as a transportation device.

As mentioned previously, utilization of non-rechargeable battery packs with the eSlate units eliminates the necessity to charge batteries continuously while in storage. This substantially eases the storage burden on eSlate System owners by eliminating the need for a power source to the stored units. Storage costs are further reduced for system owners because of eSlate's rugged design, which allows the units to withstand a broad range of conditions during storage. Expensive climate-controlled warehousing is not necessary for eSlate System components.

Equipment storage concerns are further reduced because each eSlate or DAU comes with a specially designed eSlate Voting Booth. These booths provide a number of valuable benefits for election administrators, Poll Workers, and voters.

- **Compact storage** The eSlate voting booth stores the voting unit securely in the booth, thereby reducing storage space requirements. The low unit weight and small, regular shaped physical profiles of the components facilitate efficient storage.
- **Special design for warehouse operations** The ports for data cables are on the outside of the booth, facilitating connection to warehouse utilities software without removing the voting unit from the booth.
- **Tamper detection** Each eSlate voting booth may be secured with a security seal for tamper detection while in the warehouse or in storage at the polling place, before or after use.

To facilitate warehouse operations, the County may choose to use the booth caddies designed especially for storing and moving the booths in the warehouse.

Hart InterCivic tests its products using state of the art test methodologies for validating product reliability and manufacturing processes. Before placing the eSlate on the market, the designs were validated for product life and reliability using Highly Accelerated Life Testing (HALT) techniques. HALT testing subjects the product to destructive temperature and vibration stresses – enough to expose any weaknesses in design or manufacture. Any weaknesses exposed are addressed and testing continues with the process repeating until the equivalent end-of-life is reached.

To monitor manufacturing process tolerances, sample units from each production run are subjected to Highly Accelerated Stress Screening (HASS). HASS