Test Report for Colorado State Certification Testing Performed on Election Systems & Software EVS 5.2.0.0

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1.0 INTRODUCTION

The purpose of this Test Report is to document the findings from National Technical Systems, Inc. (NTS) Huntsville's testing of the Election Systems & Software (ES&S) Voting System (EVS) 5.2.0.0 voting system to requirements set forth by the Colorado Secretary of State (SOS). The EVS 5.2.0.0 system was tested by NTS Huntsville based on the requirements set forth in the Election Rules [8 CCR 1505-1] Rule 21, herein referred to as Rule 21.

1.1 Scope of Testing

The focus of the EVS 5200 Colorado test campaign was to verify functionality of the voting system to meet the requirements as outlined in Rule 21. The scope of testing was established by the office of the Colorado SOS.

1.2 References

- Election Assistance Commission 2005 Voluntary Voting System Guidelines, Volume I, Version 1.0, "Voting System Performance Guidelines," and Volume II, Version 1.0, "National Certification Testing Guidelines," dated December 2005
- Election Assistance Commission Testing and Certification Program Manual, Version 1.0
- Election Assistance Commission Voting System Test Laboratory Program Manual
- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150)," dated February 2006
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)," dated May 2008
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002
- Test Guidelines Documents: EMI-001A, Test Guidelines for Performing Electromagnetic Interference (EMI) Testing," and EMI-002A, "Test Procedure for Testing and Documentation of Radiated and Conducted Emissions Performed on Commercial Products"
- Quality Assurance Program Manual, Revision 5
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- EAC Requests for Interpretation (RFI) (listed on www.eac.gov)
- EAC Notices of Clarification (NOC) (listed on www.eac.gov)
- EAC Quality Monitoring Program residing on:
- http://www.eac.gov/testing_and_certification/quality_monitoring_program.aspx
- NTS Test Report No. T71379.01-01 Rev B – National Certification Test Report for Certification Testing of the Election Systems & Software EVS 5.2.0.0 Voting System

1.3 Terms and Abbreviations

Table 1-1 defines all terms and abbreviations applicable to this Test Plan.

Table 1-1. Terms and Abbreviations

Term	Abbreviation	Definition
Americans with Disabilities Act 1990	ADA	ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability
Configuration Management	CM	Systems engineering process for establishing and maintaining consistency of a product's performance, functional and physical attributes with its requirements, design and operational information throughout its life
Commercial Off-the-Shelf	COTS	Commercial, readily available hardware or software
United States Election Assistance Commission	EAC	Commission created per the Help America Vote Act of 2002, assigned the responsibility for setting voting system standards and providing for the voluntary testing and certification of voting systems
ES&S Event Log Service	ELS	ES&S Event Log Service is a Windows Service that runs in the background of any active ES&S Election Management software application to monitor the proper functioning of the Windows Event Viewer
Election Management System	EMS	Within the EVS 5.2.0.0 voting system, the EMS is comprised of five components: ElectionWare, ERM, ES&S Event Log Service, VAT Previewer, and ExpressVote Previewer
Election Reporting Manager	ERM	EVS 5.2.0.0 EMS reporting component
Election Systems and Software	ES&S	Identified vendor of the equipment under test as part of this test plan
Equipment Under Test	EUT	Refers to the individual system component or multiple piece of the same component
ES&S Voting System	EVS	Proprietary equipment owned by ES&S
Functional Configuration Audit	FCA	Verification of system functions and combination of functions cited in the manufacturer’s documentation
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
Intelligent Mark Recognition	IMR	Visible light scanning technology to detect completed ballot targets
National Institute of Standards and Technology	NIST	Government organization created to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhances economic security and improves our quality of life
Notice of Clarification	NOC	Provides further guidance and explanation on the requirements and procedures of the EAC's Voting System Certification or Voting System Testing Laboratory programs.

1.3 Terms and Abbreviations (Continued)

Table 1-1. Terms and Abbreviations (Continued)

Term	Abbreviation	Definition
Physical Configuration Audit	PCA	Review by accredited test laboratory to compare voting system components submitted for certification testing to the manufacturer's technical documentation, and confirmation the documentation meets national certification requirements
Personal Computer	PC	Computer component of the EVS 5.2.0.0 voting system
Quality Assurance	QA	Administrative and procedural activities implemented as a way of preventing mistakes or defects.
Request for Interpretation	RFI	A means by which a registered Manufacturer or Voting System Test Laboratory (VSTL) may seek clarification on a specific Voluntary Voting System Guidelines (VVSG) standard
Removable Media Service	RMS	EMS software component used for defining contests
System Under Test	SUT	Refers to the system as a whole (all components)
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing
Underwriters Laboratories Inc.	UL	Safety consulting and certification company
Uninterruptible Power Supply	UPS	Electrical apparatus providing emergency power when an input power source fails
Voter Assist Terminal	VAT	The electronic ballot marking device component is the ES&S AutoMARK
National Technical Systems, Inc.	NTS	The identified VSTL hosting the testing of the equipment listed this test plan
NTS Operating Procedure	OP	NTS Test Method or Test Procedure
Voting System Test Laboratory	VSTL	NTS
Voluntary Voting System Guidelines	VVSG	EAC Voluntary Voting System Guidelines Version 1.0

2.0 SYSTEM IDENTIFICATION AND OVERVIEW

This section provides the description of the submitted ES&S 5.2.0.0 voting system.

2.1 System Overview

Table 2-1 through Table 2-3 list the software, hardware, and peripheral information.

Table 2-1. Baseline EAC Certified Software

Software Required For Testing	Software/Firmware Version
Proprietary Software	
ElectionWare	4.6.0.0
Election Reporting Manager (ERM)	8.11.0.0
ES&S Event Log Service (ELS)	1.5.5.0
ExpressVote Previewer	1.4.0.0
Removable Media Service (RMS)	1.4.5.0
VAT Previewer	1.8.6.0
COTS Software	
Adobe Acrobat Standard	11
Cerberus FTP	6.0.7.1
Microsoft Server 2008	R2
Microsoft Windows 7, SP1	5.1
Microsoft Visual C++ 2008 Redistributable – x64	9.0.30729
Microsoft Visual C++ 2010 x64 Redistributable	10.0.40219
Microsoft Visual C++ 2010 x86 Redistributable	10.0.40219
Microsoft .net Framework	4.5.1
Micro Focus RM/COBOL Runtime	12.06
Symantec Endpoint Protection - Small Business Edition 2013	12.1.4

Table 2-2. Baseline EAC Certified Voting System Equipment

Component	Hardware Version	Firmware Version
Proprietary Hardware		
ExpressVote Accessible Voting Station	1.0	1.4.0.0
DS200 Precinct Count Scanner	1.2.1, 1.2.3, & 1.3	2.12.0.0
DS850 Central Count Scanner	1.0	2.10.0.0
Plastic Ballot Box	1.2 & 1.3	N/A
Metal Ballot Box	1.0, 1.1, & 1.2	N/A
COTS Hardware		
Motorola QR Code Scanner	DS9208	N/A
Delkin USB Flash Drives	1, 2, 4, & 8GB	N/A
Delkin Compact Flash	1GB	N/A
OkiData Report Printer	OKI B6300	N/A
Avid Headphones	Avid FV 60	N/A

2.1 System Overview (Continued)

Table 2-3. Test Support Materials

Test Material	Quantity	Make	Model
Ballot on Demand Printer	1	OKI Data	C9650
ExpressPass Printer	1	Microcom	4200
ES&S Pens	5	BIC	Grip Roller
Pencil	1	Dixon	No. 2
Black Pen	1	Bic	Round Stic Med
Blue Pen	1	Bic	Round Stic Med
Red Pen	1	Bic	Cristal 1.6mm
Green Pen	1	Bic	Cristal 1.6mm
Ethernet Switch	1	Dell	HNC67M1
CF Card Reader	1	SanDisk	018-6305

2.2 Technical Data Package

A complete listing of the EAC certified EVS 5.2.0.0 TDP is provided in Appendix D.

3.0 TEST BACKGROUND

All testing performed as part of the EVS 5.2.0.0 state test campaign was performed at the NTS Huntsville facility. Testing performed followed NTS Huntsville procedures for testing and the specific test cases developed for this campaign met the 2005 VVSG.

3.1 Certification Background

NTS Huntsville is an independent testing laboratory for systems and components under harsh environments, including dynamic and climatic extremes as well as the testing of electronic voting systems. NTS Huntsville holds the following accreditations:

- ISO-9001:2000
- NVLAP Accredited ISO 17025:2005
- EAC Accredited VSTL, NIST 150,150-22
- A2LA Accredited (Certification No.'s 0214.40, 0214.41, and 0214.42)
- FCC Approved Contractor Test Site (Part 15, 18)

3.2 NTS Quality Assurance

All work performed on this test campaign was in accordance with the NTS Huntsville Quality Program Manual, which conforms to the applicable portions of International Standard Organization (ISO) Guide 17025.

The NTS Huntsville Facility, Quality Management System is registered in compliance with the ISO-9001 International Quality Standard. Registration has been completed by Quality Management Institute (QMI), a Division of Canadian Standards Association (CSA).

3.3 Test Equipment and Instrumentation

All instrumentation, measuring, and test equipment used in the performance of this test program were calibrated in accordance with NTS Huntsville's Quality Assurance Program, which complies with the requirements of ANSI/NCSL 2540-1, ISO 10012-1, and ISO/IEC 17025. Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards, or the basis for calibration is otherwise documented.

3.4 Anomalies

NTS Huntsville defines an anomaly as any unexpected result and/or events deviate from what is standard, normal, or expected in which no root cause has been determined. All anomalies are logged and monitored throughout the test campaign and subsequent testing efforts. Anomalies may become deficiencies when a root cause is established. A description of any anomaly encountered during testing is provided in Appendix C of this report.

3.5 Deficiencies and Resolutions

NTS Huntsville defines a deficiency as any repeatable test result or event that is counter to the expected result or violates the specified requirements. Deficiencies are placed into the NTS deficiency tracking system (Mantis) for disposition and resolution. The deficiencies generated are summarized in the summary findings below their respected section of the test report and their resolutions are presented in their entirety in Appendix B of this report.

4.0 TEST DESCRIPTION AND FINDINGS

The following sections provide a test description and summary of results for the individual tests NTS Huntsville conducted to verify that EVS 5.2.0.0 complies with the Colorado State Requirements. Testing was performed in regular election mode unless otherwise stated. Any deficiencies are documented within the summary findings.

4.1 Functional Test Findings

Functional testing utilized both the GEN01 and PRIM01 election definitions. Election definitions included parties for different races, selection of pair candidates (President and Vice President), n of m contest, non-partisan contest, and issues. Each election was modified as necessary to test to the Colorado State requirements listed in the Requirements Matrix located in Appendix A.

Summary Findings

A total of three deficiencies were discovered during functional testing. EVS 5.2.0.0 did not perform as required by Rules 10.5.1, 1-5-704(1)(f), and 1-5-704(1)(h). Full details of the deficiency can be found in Appendix B – Deficiency Report.

4.2 Marks Consistency and Threshold Test Findings

A series of ballots representing different colors, marks, and weights were prepared and utilized for this test. The ballots utilized for testing are provided in Appendix E. Each ballot type was processed 100 times in both the DS200 and DS850. The marking protocols for the ballots were as follows:

4.2 Marks Consistency and Threshold Test Findings (Continued)

- Beginning with ballot position one, mechanically marked at 1% fill from the center of the target with CMYK color value 0, 0, 0, 100 (BLACK). Continued marking every other ballot position at a 1% fill increase per ballot position until 100% fill was reached. Repeated marking with the following colors:

  - 97, 78, 39, 29 (MIDNIGHT BLUE)
  - 100, 100, 0, 20 (MEDIUM BLUE)
  - 100, 0, 100, 50 (GREEN)
  - 0, 100, 100, 0 (RED)
  - 0, 0, 0, 34 (DARK GRAY)

- Beginning with ballot position one, mechanically marked at 1% fill from the left side of the target with CMYK color value 0, 0, 0, 100 (BLACK). Continued marking every other ballot position at a 1% fill increase per ballot position until 100% fill was reached. Repeated marking with the following colors:

  - 97, 78, 39, 29 (MIDNIGHT BLUE)
  - 100, 100, 0, 20 (MEDIUM BLUE)
  - 100, 0, 100, 50 (GREEN)
  - 0, 100, 100, 0 (RED)
  - 0, 0, 0, 34 (DARK GRAY)

- Beginning with ballot position one, mechanically marked at 1% fill from the right side of the target with CMYK color value 0, 0, 0, 100 (BLACK). Continued marking every other ballot position at a 1% fill increase per ballot position until 100% fill was reached. Repeated marking with the following colors:

  - 97, 78, 39, 29 (MIDNIGHT BLUE)
  - 100, 100, 0, 20 (MEDIUM BLUE)
  - 100, 0, 100, 50 (GREEN)
  - 0, 100, 100, 0 (RED)
  - 0, 0, 0, 34 (DARK GRAY)

- Beginning with ballot position one, mechanically marked a 1mm line at 0° that bisected the target area. Continued marking every other ballot position rotating the line at 45° until the end of ballot.

- Beginning with ballot position one, hand marked each odd position with a checkmark and every even position with an X. The marks were made with black, blue, green, red ink pens and a No. 2 pencil.

<u>Summary Findings</u>

Results for the DS200 and the DS850 are outlined below. Threshold and Consistency data are in Table 4-1 for the DS200 and Table 4-2 for the DS850. Data was arranged by color and consistency percentage. In the tables below, Indeterminate Mark Recognition Range represents the range of percentage fill that the vote capture device inconsistently detects marks. Marks smaller than this threshold were not

4.2 Marks Consistency and Threshold Test Findings (Continued)

detected, and marks greater than the listed threshold achieved a 100% detection rate. Detailed data tables for this test are in Appendix F.

Table 4-1. DS200 Mark Consistency and Threshold Summary

Color Value	Green	Red	Midnight Blue	Medium Blue	Black
% Fill Increase from Right					
Indeterminate Mark Recognition Range	35% - 52%	29% - 48%	35% - 45%	35% - 52%	31% - 44%
100% Mark Recognition Threshold	53%	49%	46%	53%	45%
% Fill Increase from Center					
Mark Recognition Threshold	31% - 44%	27% - 46%	27% - 45%	27% -51%	29% - 51%
100% Mark Recognition Threshold	45%	47%	46%	52%	52%
% Fill Increase from Left					
Mark Recognition Threshold	31% - 50%	31% - 53%	31% - 52%	31% - 40%	33% - 47%
100% Mark Recognition Threshold	51%	54%	53%	41%	48%

Table 4-2. DS850 Mark Consistency and Threshold Summary

Color Value	Green	Red	Midnight Blue	Medium Blue	Black
% Fill Increase from Right					
Mark Recognition Threshold	35% - 43%	38% - 43%	37% - 42%	38% - 43%	35% - 44%
100 % Mark Recognition	44%	44%	43%	44%	45%
% Fill Increase from Center					
Mark Recognition Threshold	29% - 34%	28% - 34%	28% 33%	27% -51%	28% - 34%
100 % Mark Recognition	35%	35%	34%	52%	35%
% Fill Increase from Left					
Mark Recognition Threshold	31% - 37%	32% - 37%	31% - 36%	32% - 36%	32% - 40%
100 % Mark Recognition	38%	38%	37%	37%	41%

Dark Gray, as represented in Appendix E (Figure E-7 through E-12) and depicted in the data tables in Appendix F, cannot be consistently detected at any level of percentage of fill.

The hand marked alternating mark method, which included check marks and ‘x’s, as illustrated in Appendix E (Figure E-1 through E-5), were inconsistently read throughout the entire test sequence.

The one millimeter, 45°, rotating computer marked with black ink, as represented in Appendix E (Figure E-6), was consistently read in all orientations.

4.3 Multiple Ballot Issue/Large Ballot Issue Test Findings

The Ballot Issues election definition was utilized for this test to verify that EVS 5.2.0.0 can support a ballot with a minimum 20 pairs of "yes-no" ballot issues and at least 200 words in a single issue. A total of 20 ballots were cast in both the DS200 and DS850. The test deck was marked with 10 all "yes" and 10 all "no" ballots.

Summary Findings

No Deficiencies were discovered during this testing.

4.4 Security Test Findings

NTS Huntsville evaluated the EVS 5.2.0.0 Voting System to the security requirements set forth in the following sections of Rule 21:

- 21.4.9.a
- 21.4.9.d
- 21.4.10.a.(2)(A)
- 21.4.10.a.(2)(B)
- 21.4.10.d.(2)(A)
- 21.4.10.e.(2)
- 21.4.10.e.(8)
- 21.4.10.f(1)
- 21.4.10.f(2)
- 21.4.10.f(3)
- 21.4.10.g(1)
- 21.4.10.g(2)

Summary Findings

No Deficiencies were discovered during this testing.

4.5 Documentation Review Findings

NTS Huntsville evaluated the EVS 5.2.0.0 Voting System to the documentation requirements set forth in the following sections of Rule 21:

- 21.4.13.c(1)
- 21.4.13.d(2)
- 21.4.13.i(8)
- 21.4.13.q

Summary Findings

No deficiencies were discovered during this testing.

5.0 CONCLUSION

Based on the testing performed and the results obtained, EVS 5.2.0.0 met all applicable requirements identified by the State of Colorado in the Requirements Matrix except for the three following requirements:

- 10.5.1(a) – The official county abstract must include, by precinct or ballot style, where applicable: a. The total number of active registered electors on election day;

- 1-5-704(1)(f) – Any voting system that requires any visual perception shall allow the font size as it appears to the voter to be set from a minimum of fourteen points to a maximum of twenty-four points before the voting system is delivered to the polling location.

- 1-5-704(1)(h) – For voice signals transmitted to the elector, the voting system shall provide a gain adjustable up to a minimum of twenty decibels with at least one intermediate step of twelve decibels.

The detailed description of the test requirements and their disposition is located Appendix A.

Any changes, revisions, or corrections made to the system after this evaluation are required to be submitted to the state of Colorado to determine if the modified system requires a new application, or can be submitted as a modified system. The scope of testing required will be determined based upon the degree of modification.

APPENDIX A – REQUIREMENTS MATRIX

A.1 REQUIREMENTS MATRIX

Each Colorado voting system certification requirement has one of the following dispositions within the requirements matrix. The dispositions are categorized with the following explanations:

- Requirement satisfied by EVS 5.2.0.0 EAC Certification – The Colorado requirement was met in a previous testing effort
- Requirement satisfied per CO SOS – The Colorado Secretary of State office determined that the requirement was met.
- N/A – The Colorado requirement was not applicable to the EVS 5.2.0.0 coting system.
- Requirement tested and satisfied – The Colorado requirement was tested as part of the testing effort outlined in this report and EVS 5.2.0.0 was found in compliance.
- Requirement tested and not satisfied - The Colorado requirement was tested as part of the testing effort outlined in this report and EVS 5.2.0.0 was not in compliance.

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.3- Application Procedure					
21.3.6	The voting system provider must coordinate with the Secretary of State for the establishment of the trusted build. The voting system provider must submit all documentation and instructions necessary for the creation and guided installation of files contained in the trusted build which will be created at the start of functional testing and will be the model tested. At a minimum, the trusted build must include a complation of files placed on write once media, and an established hash file distributed from a VSTL or the National Software Reference Library to compare federally certified versions. The trusted build disks should all be labeled with identification of the voting system provider's name and release version.	Trusted build from EVS 5.2.0.0 EAC Certification will be used.	Trusted build from EVS 5.2.0.0 EAC Certification will be used.	Trusted build from EVS 5.2.0.0 EAC Certification will be used.	Trusted build from EVS 5.2.0.0 EAC Certification will be used.
21.4.4 - Independent Analysis					
21.4.4.a	An application penetration test conducted to analyze the system for potential vulnerabilities according to current industry standards that may result from poor or improper system configuration, known or unknown hardware or software flaws, or operational weaknesses in process or technical countermeasures. The test must involve active exploitation of security vulnerabilities of the voting system, whether or not the vulnerabilities can be mitigated through compensating controls.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.5 - Functional Requirements					
21.4.5.a	Functional requirements must address all detailed operations of the voting system related to the management and controls required to successfully conduct an election.				
21.4.5.b	The voting system must provide for appropriately authorized users to:				
21.4.5.b(1)	Set up and prepare ballots for an election;	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.5.b(2)	Lock and unlock system to prevent or allow changes to ballot design;	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.5.b(3)	Conduct hardware diagnostic testing;	N/A - EMS is software	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification
21.4.5.b(4)	Conduct logic and accuracy testing;	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification
21.4.5.b(5)	Conduct an election and meet requirements as identified in this Rule 21 for procedures for voting, auditing information, inventory control where applicable, counting ballots, opening and closing polls, recounts, reporting and accumulating results;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.5.b(6)	Conduct the post election audit; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.5.b(7)	Preserve the system for future election use.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.5.c	The voting system must integrate election day voting results with mail and provisional ballot results.	Requirement tested and satisfied	N/A - DS200 is a precinct count component	Requirement tested and satisfied	N/A - ExpressVote is a BMD component
21.4.5.d	The election management system must provide authorized users with the capability to produce electronic files including election results in either ASCII (both comma-delimited and fixed-width) or web-based format. The software must provide authorized users with the ability to generate these files on an "on-demand" basis. After creating such files, the authorized users must have the capability to copy the files to diskette, tape, CD-ROM or other media type.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.5.d(1)	Exports necessary for the Secretary of State must conform to a format approved by the Secretary of State. The format must be compatible with a commercially available data management program such as a spreadsheet, database, or report generator.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.5.e	The voting system must include hardware or software to enable the closing of the voting location and disabling the acceptance of ballots on all vote tabulation devices to allow for the following:				
21.4.5.e(1)	Printout of the time the voting system was closed.	N/A - EMS is not a precinct or central count system	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e(2)	Printout of the public counter and protective counter upon closing the ballot casting functionality.	N/A - EMS is not a precinct or central count system	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e(3)	Ability to print a report which must contain:				
21.4.5.e.3(A)	Names of the offices;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(B)	Names of the candidates and party, when applicable;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(C)	A tabulation of votes from ballots of different political parties at the same voting location in a primary election;	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(D)	Ballot titles;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(E)	Submission clauses of all initiated, referred or other ballot issues or questions; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(F)	The number of votes counted for or against each candidate or ballot issue.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(G)	Date of election (day, month and year);	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(H)	Precinct number (six digit format);	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(I)	County or jurisdiction name;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(J)	"State of Colorado";	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.3(K)	Count of votes for each contest; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component

A.1 REQUIREMENTS MATRIX (CONTINUED)

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.4.5.e.III.)	An election judge's certificate with an area for judges' signatures with the words similar to: "Certified by us", and "Election Judges". Space must allow for a minimum of two signatures.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.e.iv	Votes counted by a summary of the voting location and by individual precincts.	Requirement satisfied per CO SOS	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - ExpressVote is a BMD component
21.4.5.e(5)	Ability to produce multiple copies of the unofficial results at the close of the election.	N/A - EMS is not a precinct or central count system	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	N/A - ExpressVote is a BMD component
21.4.5.f	The election management system must ensure that an election setup may not be changed once ballots are printed and/or election media devices are downloaded without proper authorization and acknowledgement by the application administrative account. The application and database audit transaction logs must accurately reflect the name of the system operator making the change(s), the date and time of the change(s), and the "old" and "new" values of the change(s).	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.5.g	All DRE or BMD voting devices must use technology providing visual or auditory ballot display and selection methods used by people with disabilities.	N/A - EMS is not a BMD or a DRE	N/A - DS200 is not a BMD or a DRE	N/A - DS850 is not a BMD or a DRE	Requirement satisfied by EVS 5.2.0.0 EAC Certification
21.4.5.h	All electronic voting devices supplied by the voting system provider and used at voter service and polling centers must have the capability to continue all normal voting operations and provide continuous device availability during a 2-hour period of electrical outage without any loss of election data.	N/A - EMS is not required to meet the 2hour backup requirement	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.5.i	The voting system must provide capabilities to protect the anonymity of ballot choices.	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.5.(1)	All optical scan devices, associated ballot boxes, and VVPAT storage devices must provide physical locks and procedures during and after the voter casting operation.	N/A - EMS is not required to meet this requirement	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - ExpressVote is a BMD component
21.4.5.(2)	All DRE devices must provide randomization of all voter choices and stored electronic ballot information during and after storage of the voters' ballot selections.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.6 - Physical and design characteristics					
21.4.6.a	Physical and design characteristics must address any and all external or internal construction of the physical environment of the voting system.	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification
21.4.6.b	The voting system provider must submit drawings, photographs and any related brochures or documents to assist with the evaluation of the physical design of the use of the voting system.	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification
21.4.7 - Ballot Definition Subsystem					
21.4.7.a	The ballot definition subsystem of the voting system application consists of hardware and software required to accomplish the functions outlined in this Rule.				
21.4.7.b	The ballot definition subsystem must be capable of handling at least 300 potentially active voting positions, arranged to identify party affiliations in a primary election, offices with their associated labels and instructions, candidate names with their associated labels and instructions and ballot issues or questions with their associated text and instructions.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.7.c	The voting system must accommodate single page ballots (races on one face or both faces) and two page paper ballots (races on three or four faces).	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.7.d	The ballot definition subsystem must:				
21.4.7.d(1)	Provide a facility for the definition of the ballot, including the definition of the number of allowable choices for each office and contest and for special voting options such as write-in candidates; and	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.7.d(2)	Generate all required masters and distributed copies of the ballot definition files.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.8 Trusted build					
???	The voting system must allow the operating system administrative account to verify that the software installed is the certified software by comparing it to the trusted build or other reference information.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.9 - Audit Capacity					
21.4.9.a	The voting system must track and maintain read only audit information of the following election management system events:				
21.4.9.a(1)	Log on and log off activity;	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.9.a(2)	Application start and stop;	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.9.a(3)	Printing activity, where applicable;	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.9.a(4)	Election events – set for election, unset for election, open polls, close polls, end election, upload devices, download devices, create ballots, create precincts, create districts, create voter service and polling centers, initialize devices, backup devices and voting activity; and	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.9.a(5)	Hardware events – add hardware, remove hardware, initialize hardware, and change hardware properties.	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.9.b	All tabulation devices must display the unit serial number(s) both physically and within any applicable software, logs or reports.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.9.c	Voter tabulation devices must allow for an alternate method of transfer of audit records if the device or a memory storage device is damaged or destroyed.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.9.d	All transaction audit records of the election databases must be maintained in a file outside of or separate from the database in a read only format.	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10 - Security requirements					
21.4.10	All voting systems must meet the following minimum system security requirements:				
21.4.10.a	The voting system must meet the following requirements to accommodate a general system of access by least privilege and role-based access control:				
21.4.10.a(1)	Operating system administrative accounts may not have access to read or write data to the database;	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component

A.1 REQUIREMENTS MATRIX (CONTINUED)

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.4.10.a.(2)	Operating system user/operator accounts must be able to be created that are restricted from the following aspects of the operating system:				
21.4.10.a.(2)(A)	No access to system root directory;	System does not allow write access	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.a.(2)(B)	No access to operating system specific folders;	System does not allow write access	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.a.(2)(C)	No access to install or remove programs; and	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.a.(2)(D)	No access to modify other user accounts on the system.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.a.3	Application administrative accounts must have full access and rights to the application and database;	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.a.4	Application user/operator accounts must have limited rights specifically designed to perform functional operation within the scope of the application. This user/operator must be restricted in the creation or modification of any user/operator accounts.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.b	The voting system must meet the following requirements for network security:				
21.4.10.b(1)	All network-applicable components of the voting system must have the ability to operate on a closed network dedicated to the voting system;	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - DS200 does not have any network components	N/A - DS850 does not have any network components	N/A - ExpressVote does not have any network components
21.4.10.b(2)	All network-applicable components of the voting system must include the limited use of non-routable IP address configurations for any device connected to the closed network. For the purposes of this requirement, non-routable IP addresses are those defined in the RFC 1918 Address base; and	Requirement tested and satisfied	N/A - DS200 does not have any network components	Requirement tested and satisfied	N/A - ExpressVote does not have any network components
21.4.10.b(3)	The voting system must include provisions for updating security patches, software and/or service packs without access to the open network.	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - DS200 does not have any network components	N/A - DS850 does not have any network components	N/A - ExpressVote does not have any network components
21.4.10.c	All voting systems that use databases must: Have databases hardened to specifications developed by the voting system provider. Documentation included with the application must provide a detailed procedure for hardening according to current industry standards. Any government or industry guidelines adopted in whole, or in part, are to be identified in the documentation.	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - DS200 does not have any network components	N/A - DS850 does not have any network components	N/A - ExpressVote does not have any network components
21.4.10.d	The voting system must meet the following requirements for operating system security:				
21.4.10.d(1)	All voting systems must have all operating systems hardened to specifications developed by the voting system provider according to current industry standards. Documentation included with the application must provide a detailed procedure for hardening. Any government or industry guidelines adopted in whole, or in part, are to be identified in the documentation.	Requirement satisfied by EVS 5.2.0.0 EAC Certification	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.d(2)	The voting system provider must configure the voting system operating system of the workstation and server used for the election management software to the following requirements:				
21.4.10.d(2)(A)	The ability for the system to take an action upon inserting a removable media (auto run) must be disabled; and	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.d(2)(B)	The operating system must only boot from the drive or device identified as the primary drive.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.d(3)	The voting system provider must use a virus protection/prevention application on the election management server(s)/workstations which must be capable of manual updates without the use of direct connection to the internet.	Requirement satisfied per CO SOS	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.10.e	The voting system must meet the following requirements for password security:				
21.4.10.e(1)	All passwords must be stored and used in a non-reversible format.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.10.e(2)	Passwords to the database must not be stored in the database;	Requirement tested and satisfied	N/A - DS200 does not have a data base component	N/A - DS850 does not have a data base component	N/A - ExpressVote does not have a data base component
21.4.10.e(3)	Password to the database must be owned and only known by the application;	Requirement satisfied per CO SOS	N/A - DS200 does not have a data base component	N/A - DS850 does not have a data base component	N/A - ExpressVote does not have a data base component
21.4.10.e(4)	The application's database management system must require separate passwords for the administrative account and each operator account;	Requirement satisfied per CO SOS	N/A - DS200 does not have a data base component	N/A - DS850 does not have a data base component	N/A - ExpressVote does not have a data base component
21.4.10.e(5)	The system must be designed in such a way to ensure that the use of the administrative account password is not required for normal operating functions;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.10.e(6)	The system must be designed in such a way to facilitate the changing of passwords for each election cycle;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.10.e(7)	The use of blank or empty passwords must not be permitted at any time with the exception of a limited one-time use startup password which requires a new password to be assigned before the system can be used; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.10.e(8)	All voting systems must have all components of the voting system capable of supporting passwords of a minimum of eight characters, and must be capable of including numeric, alpha and special characters in upper case or lower case used in any combination.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.10.f	All modules of the system must meet the 2002 voting system standards requirements for installation of software, including hardware with embedded firmware:	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification	Requirement satisfied by EVS 5.2.0.0 EAC Certification
21.4.10.f(1)	Where the system includes a feature to interpret and control execution using data from a script, code tokens, or other form of control data file separate from the source code, the human-readable source information must be made available as part of a source code review.	N/A	N/A	N/A	N/A
21.4.10.f(2)	Security features and procedures must be defined and implemented to prevent any changes of interpreted data files after the initial election testing of the final election definition Replacement of the interpreted data files with tested and approved files from the trusted build must be by authorized personnel before the election definition is finalized for an election.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied

A.1 REQUIREMENTS MATRIX (CONTINUED)

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.4.30.(5)(i)	The introduction of interpreted data during execution must not be permitted unless defined as a predefined set of commands or actions subject to security review and the interpretation function provides security edits on input to prevent the introduction of other commands or the modification or replacement of existing code.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.30.(5)(j)	The application must not allow users to open database tables for direct editing.	Requirement satisfied per CO 505	N/A - DS200 does not have a database component	N/A - DS850 does not have a database component	N/A - ExpressVote does not have a database component
21.4.30.g	All voting systems must meet the following minimum requirements for removable storage media with data controls:				
21.4.30.g(1)	All voting data stored that includes, ballot images, tally data and cast vote records must be authenticated and validated.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	N/A - ExpressVote does not store ballot images
21.4.30.g(2)	All non-voting data stored must be authenticated, encrypted, and validated.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.30.g(3)	All removable media, upon insertion on server and/or workstations having the elections management software, must automatically be scanned by antivirus software.	Requirement satisfied per CO 505	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is a BMD component
21.4.31 - Telecommunications requirements					
21.4.31.a	Telecommunications includes all components of the system that transmit data outside of the closed network as defined in this Rule.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.b	All electronic transmissions from a voting system must meet the 2002 Voting System Standards.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.c	Modems from remote devices must be programmed to be "dial-only" and not receive a call.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.d	Any modem that fails to meet the requirements of this rule may not be used by any voting system.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.e	Line of sight infrared technology may only be used in a closed environment where the transmission and reception is shielded from external infrared signals and can only accept infrared signals generated from within the system.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.f	All systems that transmit data over public telecommunications networks must maintain an audit trail when election results are transmitted.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.g	Voting systems that transmit data through any telecommunications medium must be able to recover, either automatically or with manual intervention, from incomplete or failed transmission sessions and resume transmissions when telecommunications are reestablished.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.g(1)	Recovery of transmissions must include notations of the interrupted transmission session and the resumed transmission session in the system and application transaction logs.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.31.g(2)	Failure and recovery of transmissions must not cause any error in data transmitted from the voter service and polling centers to the central election site during a recovered transmission session.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.	N/A - EVS 5.2.0.0 does not transmit data outside of a closed network.
21.4.32 - Voter-verifiable paper record requirements					
21.4.32.a	Existing systems that are retrofitted to comply with section 1-5-802(1), C.R.S., must be examined for certification by the Secretary of State. Any retrofitted voting system must comply with the process and application for certification as identified by this Rule.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.b	The VVPAT must include the following components:				
21.4.32.b(1)	A paper audit trail writer or printer that must be attached, built into or used in conjunction with the DRE, and must duplicate a voter's selections from the DRE onto a paper record;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.b(2)	A paper record display unit or area that must allow a voter to view his or her paper record; and	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.b(3)	A paper record storage unit that must store cast and spoiled paper record copies securely.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c	The VVPAT must meet the following functional requirements:				
21.4.32.c(1)	The printer may only communicate with the voting device to which it is connected;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(2)	The printer must function only as a printer, and not perform any other non-printer related services ;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(3)	Produce a paper record for every corresponding electronic voting record;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(4)	Provide a "low supply" warning to the election official to add paper, ink, toner, ribbon or other like supplies. In the event that an election official is required to change supplies during the process of voting, the voter must be allowed to reprint and review the paper record without having to mark his or her ballot. The device must prevent the election official from seeing a voter's ballot.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(5)	Stop all operations if the printer is not working as designed.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(6)	Allow a voter to spoil his or her paper record no more than two times.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(7)	Upon spoiling, the voter must be able to modify and verify selections on the DRE without having to reselect all of his or her choices.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(8)	Before the voter causes a third and final record to be printed the VVPAT must present the voter with a warning notice that the selections made on screen shall be final and the voter may see and verify a printout of his or her vote, but must not be given additional opportunities to change their vote.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(9)	When VVPAT components are integrated into a previously certified voting system the new configuration of the voting system must comply with existing state testing and auditing requirements.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.32.c(10)	Print a barcode with each record that contains the human readable contents of the paper record. The voting system provider must include documentation of the barcode type, protocol, and/or description of barcode and the method of reading the barcode as applicable to the voting system.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT

A.1 REQUIREMENTS MATRIX (CONTINUED)

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.4.12.c(11)	If used for provisional ballots, the VVPAT must be able to mark paper records as a provisional ballot through the use of human-readable text and optionally printing barcode and/or serial number information, which must provide for mapping the record back to the electronic record and the provisional voter for processing after verification in accordance with Article 8.5 of Title 1, C.R.S.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d	The VVPAT must meet the following design requirements:				
21.4.12.d(1)	Allow every voter to review and accept or reject his/her paper record in as private and independent manner as possible regardless of whether the voter has disability;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(2)	Print at a font size no less than 14-point sans-serif Arial;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(3)	Allow each voter to verify his or her vote on a paper record in the same language that they voted in on the DRE;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(4)	Prevent tampering with unique keys or seals for the compartment that stores the paper record;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(5)	Print and store paper record copies for at least 75 ballots cast without requiring the paper supply source, ink or toner supply, or any other similar consumable supply to be changed, assuming a fully printed double sided 18 inch ballot with a minimum of 20 contests.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(6)	The printed information on the paper record must contain at least the following items:				
21.4.12.d(6)(A)	Name or header information of race, question or issue;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(6)(B)	Voter's selections for the race information;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(6)(C)	Write-in candidate's names if selected;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(6)(D)	Undervote information;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(6)(E)	Ability to optionally produce a unique serial number (randomized to protect privacy); and	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(6)(F)	Identification that the ballot was cancelled or cast.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(7)	Prohibit the voter from leaving the voting area with the paper record.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)	The voting system provider must provide documentation describing how to investigate and resolve malfunctions including, but not limited to the following:				
21.4.12.d(8)(A)	Misreporting votes;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)(B)	Unreadable paper records;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)(C)	Paper jams;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)(D)	Low-ink;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)(E)	Misfeeds;	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)(F)	Lost votes; and	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.12.d(8)(G)	Power failures.	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT	N/A - EVS 5.2.0.0 does not have a VVPAT
21.4.13 - Documentation Requirements					
21.4.13.a	The Secretary of State may rely upon the testing of a voting system performed by a VSTL or by another state upon satisfaction of the following conditions:				
21.4.13.a(1)	The Secretary of State has access to any documentation, data, reports or similar information upon which the VSTL or another state relied in performing its tests and will make such information available to the public subject to any redaction required by law; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.a(2)	The Secretary of State has determined that the tests were conducted in accordance with appropriate engineering standards, and the extent to which the tests satisfy the requirements of sections 1-5-615 and 1-5-616, C.R.S., and all rules promulgated under those sections.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.b	In addition to other documentation requirements in this rule, the voting system provider must provide the following documents:				
21.4.13.b(1)	Standard user users/operator manual;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.b(2)	System administrator's/application administration manual;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.b(3)	Training manual and related materials;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.b(4)	Device definition programming and diagnostics manuals; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.b(5)	A list of minimum services needed for the successful, secure and hardened operation of all components of the voting system.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.c	The voting system provider must provide documentation concerning the use of touch screen or other display and selection technology including:				
21.4.13.c(1)	Technical documentation describing the nature and sensitivity of the tactile device (if the system uses touch screen technology);	N/A - EMS does not have touch screen technology	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.13.c(2)	Technical documentation describing the nature and sensitivity of any other technology used;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.13.d	For the review of VSTL or other state testing in Rule 21.4.12(a) copies of all VSTL or state qualification reports, test logs and technical data packages must be provided to the Secretary of State.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS

A.1 REQUIREMENTS MATRIX (CONTINUED)

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.4.33.d(1)	The voting system provider must execute and submit any necessary releases for the applicable VSTL, state and/or EAC to discuss any and all procedures and findings relevant to the voting system with the Secretary of State and allow the review by the Secretary of State of any documentation, data, reports or similar information upon which the VSTL or other state relied in performing its testing. The voting system provider must provide a copy of the documentation to the Secretary of State.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.d(2)	The voting system provider, the VSTL, the state or the EAC will identify to the Secretary of State any specific sections of documents for which they assert a legal requirement for redaction.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.33.e	The voting system provider must provide documentation specifying the steps and times required for charging batteries, and the time of battery operation for each type of device they provide, assuming continuous use of the devices by voters during an interruption of normal electrical power.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.f	The Secretary of State will review submitted documentation to determine the extent to which the voting system has been tested to federal standards.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.g	Failure by the voting system provider to provide any documentation will delay processing the application and may be cause for denial of certification.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.h	The voting system must include detailed documentation, which includes the location and a description of the content of the of audit trail information throughout the system. The audit information applies to:				
21.4.33.h(1)	Operating Systems (workstation, server, optical scanner, RMD, and DRE);	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.h(2)	Election management system; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.h(3)	Election Tabulation Devices – optical scan and DRE.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i	The voting system provider must provide documentation detailing voting system security. The documentation must contain configurations, properties and procedures to prevent, detect and log changes to system capabilities for:				
21.4.33.i(1)	Defining ballot formats;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(2)	Casting and recording votes;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(3)	Calculating vote totals consistent with defined ballot formats;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(4)	Reporting vote totals;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(5)	Altering of voting system audit records;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(6)	Changing or preventing the recording of a vote;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(7)	Introducing data for a vote not cast by a registered voter;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(8)	Changing calculated vote totals;	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.33.i(9)	Preventing access to vote data, including individual votes and vote totals, to unauthorized individuals; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.i(10)	Preventing access to voter identification data and data for votes cast by the voter such that an individual can determine the content of specific votes cast by the voter.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.j	The voting system provider must provide documentation detailing the security measures it has in place for all systems, software, devices that act as connections (upload, download, and other programming devices) and any additional recommended security measures.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.k	The voting system provider must provide procedures and documentation for the use of the VVPAT.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.l	The voting system provider must publish and specify processing standards for each component of the voting system as part of the documentation required for certification.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.m	For the purpose of evaluating software, the voting system provider must provide detailed information as to the type of hardware required to execute the software.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.n	The documentation supplied by the voting system must include a statement of all requirements and restrictions regarding environmental protection, electrical service, telecommunications service and any other facility or resource required for the installation, operation and storage of the voting system.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.o	The voting system provider must provide any available data on problems caused for persons who experience epileptic seizures due to the DRE voting device's screen refresh rate.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.p	The voting system provider must deliver to the Secretary of State documentation detailing estimated time of battery operation for each type of device submitted for certification, assuming continuous use of the devices by voters during an interruption of normal electrical power.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.4.33.q	The voting system provider must deliver to the Secretary of State documentation specifying the steps and times required for charging batteries for each type of device submitted for certification.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.33.r	The voting system provider must submit documentation containing a list of minimum services and executables required to run the election management system.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5 Testing preparation procedures					
21.5.2.d	For mark sense or optical scan devices, the Secretary of State or the VSTL will prepare 100 or more test ballots with marking devices of various color, weight and consistency to determine the range of marks that can be read and the range and consistency of reading marginal marks.	N/A - EMS is not a mark sense or optical scan device.	Requirement tested and satisfied	Requirement tested and satisfied	N/A - ExpressVote is not a mark sense or optical scan device.
21.5.2.e	Ballots must be cast and counted in all applicable counter types (or counter groups) as necessary based on the parts included in the voting system. These are, at a minimum, in-person, mail, and provisional ballots. Ballots may be run through components more than one time depending on components and counter group being tested to achieve a minimum number of ballots cast as follows for each group:				
21.5.2.e(1)	Polling location / DS = 1,000;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.e(2)	Polling location / DRE = 500;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.e(3)	Mail = 1, 500; and	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.e(4)	Provisional = 500.	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.f	The requirement(s) that's/a must include the following requirements for election definitions and ballots to simulate and test "real world" situations in the State of Colorado. Election definitions and ballots must include the following minimum contest criteria:				
21.5.2.f(1)	Parties for different races;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS

A.1 REQUIREMENTS MATRIX (CONTINUED)

Colorado Statute	Statute Text	Disposition of Requirement			
		EMS	DS200	DS850	ExpressVote
21.5.2.9(2)	Selection of a pair of candidates, such as President and Vice-President;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.9(3)	In a primary election, allow voters to vote for the candidates of the party for which they are eligible and for any and all non-partisan candidates and measures, while preventing them from voting on candidates of another party;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.9(4)	In a general election, allow a voter to vote for any candidate for any office, in the number of positions allowed for the office, and to vote for any measure on the ballot that the voter is allowed to vote in, regardless of party;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.9(5)	Allow for programming to accommodate Colorado recall questions as prescribed in Article 12 of Title 1, C.R.S.;	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
21.5.2.9(6)	A minimum of 20 pairs of "yes" and "no" positions for voting on ballot issues; and	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.5.2.9(7)	Ability to contain a ballot question or issue of at least 200 words.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
Colorado Additional Testing Requirements					
Rules and Statutes	Ballot Formatting - The voting system must provide for the use of ballots that meet the following requirements:				
1-5-407(4.5)	If no candidate has been duly nominated and no person has properly filed an affidavit of intent of write-in candidate for an office, the following text shall appear under the designation of the office: "There are no candidates for this office."	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
4.4.2	If there is no candidate for an office, the ballot must state, "There are no candidates for this office."	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
1-5-613(1)(f)(I)	If the system uses a voting device:				
1-5-613(1)(f)(II)	It contains a protective counter with a register which cannot be reset, which shall register the cumulative total number of movements of the operating mechanism.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
1-5-613(1)(f)(IV)	It is capable of providing printouts of vote totals by office and candidate or by ballot issue, including a numeric-only printout to be used for testing as provided in Section 1-7-509.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
1-5-615(1)	The secretary of state shall not certify any electronic or electromechanical voting system unless such system:				
1-8.5-110(2)	Voting systems shall provide a means for reporting the results of provisional ballots as a separate total when more than 25 or inclusive with mail in ballots when less than 25.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
10.5.1	The official county abstract must include, by precinct or ballot style, where applicable:	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS	Requirement satisfied per CO SOS
10.5.1(a)	The total number of active registered electors on election day;	Requirement tested and not satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is an accessible voting station
10.5.1(b)	The total number of registered electors (active and inactive) on election day;	Requirement tested and satisfied	N/A - DS200 is a precinct count component	N/A - DS850 is a central count component	N/A - ExpressVote is an accessible voting station
18.1	Voting systems must be able to accept all or less than all pages of a multi-page ballot to allow election administrators to comply with the requirement in Rule 18.1.	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied	Requirement tested and satisfied
21.4.2	All voting systems must meet the 2002 Voting System Standards.	Requirement satisfied by EVS 5.2.0.0 FAC Certification	Requirement satisfied by EVS 5.2.0.0 FAC Certification	Requirement satisfied by EVS 5.2.0.0 FAC Certification	Requirement satisfied by EVS 5.2.0.0 FAC Certification
1-5-704(1)	Notwithstanding any other provision of this article, each voting system certified by the secretary of state for use in local, state, and federal elections shall have the capability to accept accessible voter interface devices in the voting system configuration to allow the voting system to meet the following minimum standards:				
1-5-704(1)(e)	If a nonaudio access approach is provided, the voting system may not require color perception. The voting system shall use black text or graphics, or both, on white background or white text or graphics, or both, on black background, unless the secretary of state approves other high-contrast color combinations that do not require color perception.	N/A - Voter does not interact with the EMS	N/A - DS200 does not provide any audio support	N/A - DS850 is a central count component	Requirement tested and satisfied
1-5-704(1)(f)	Any voting system that requires any visual perception shall allow the font size as it appears to the voter to be set from a minimum of fourteen points to a maximum of twenty-four points before the voting system is delivered to the polling location.	N/A - Voter does not interact with the EMS	Requirement tested and not satisfied	N/A - DS850 is a central count component	Requirement tested and not satisfied
1-5-704(1)(h)	For voice signals transmitted to the elector, the voting system shall provide a gain adjustable up to a minimum of twenty decibels with at least one intermediate step of twelve decibels.	N/A - EMS does not provide any audio support	N/A - DS200 does not provide any audio support	N/A - DS850 is a central count component	Requirement tested and not satisfied
1-5-704(1)(i)	If the voting system can exceed one hundred twenty decibel sound pressure level, a mechanism shall be included to reset the volume automatically to the voting system's default volume level after every use, such as when the handset is replaced, but not before. Universal precautions in the use and sharing of headsets should be followed.	N/A - EMS does not provide any audio support	N/A - DS200 does not provide any audio support	N/A - DS850 is a central count component	N/A - ExpressVote cannot exceed one hundred twenty decibel sound pressure level
1-5-704(1)(o)	Ballot marking devices shall meet the following standards:				
1-5-704(1)(o)(V)	The elector shall be able to mark the ballot card in complete independence and in accordance with federal and state law or mandatory accessibility for persons with disabilities.	N/A - Voter does not interact with the EMS	Requirement tested and satisfied	N/A - Voter does not interact with the DS850	Requirement tested and satisfied

APPENDIX B – DEFICIENCY REPORT

B.1 DEFICIENCY REPORT

Table B-1 describes the functional deficiency discovered during the EVS 5200 Colorado test campaign.

Table B-1. Functional Deficiency Report

Colorado Statute	Deficiency Summary	Resolution
10.5.1(a)	The respective requirement to track the total number of active registered electors on election day and The total number of registered electors (active and inactive) on election day cannot be met because ERM only tracks registered electors and does not distinguish between the active and inactive.	No resolution provided
1-5-704(1)(f)	There are no system controls that enforce a minimum or maximum font size as it is presented to the voter.	Resolution would bring EVS 5.2.0.0 out of compliance with EAC Certification
1-5-704(1)(h)	The system does not have the ability to adjust in 12 decibel steps; it adjusts in only 10 decibel steps.	Resolution would bring EVS 5.2.0.0 out of compliance with EAC Certification

APPENDIX C – ANOMALY REPORT

This page INTENTIONALLY LEFT BLANK as no Anomalies occurred during this Test Campaign.

APPENDIX D – TECHNICAL DATA PACKAGE

D.1 EVS 5.2.0.0 TECHNICAL DATA PACKAGE

The documents listed in Table D-1 comprise the EAC certified EVS 5.2.0.0 TDP.

Table E-1. EVS 5.2.0.0 TDP

EVS 5.2.0.0 TDP Documents	Version	Doc No.	Document Code
System Overview			
Voting System Overview	9.0	01-01	EVS5200_C_D_0100_SysOvr
System Functionality Description			
System Functionality Description – Voting System	6.0	02-01	EVS5200_C_D_0200_SFD
System Hardware Specification			
System Hardware Specification – DS200 Hardware Revision 1.2	3.0	03-01	DS200HW_M_SPC_0312_HWSpec
System Hardware Specification – DS200 Hardware Revision 1.3	4.0	03-02	DS200HW_M_SPC_0313_HWSpec
System Hardware Specification – DS850	1.1	03-03	DS850HW_M_SPC_0310_HWSpec
ExpressVote Hardware Specification	3.0	03-04	ExpressVoteHW_M_SPC_0310_HWSpec
AutoMARK System Hardware Overview	3.0	03-05-01	AutoMARK_ESS_System_Hardware_ Overview_AQS-18-5002-000-S
AutoMARK System Hardware Specification	3.0	03-05-02	AutoMARK_ESS_System_Hardware_ Specification_AQS-18-5000-001-F
Software Design and Specification			
Software Design and Specification – ES&S Event Log Service	1.0	04-01	EVS5200_SDS00_ELS
Software Design and Specification - ElectionWare	2.0	04-02	EVS5200_SDS00_ElectionWare
Software Design and Specification – ERM	2.0	04-03	EVS5200_SDS00_ERM
ES&S Software Design Specifications ERM Appendices	2.0	04-03-01	EVS5200_SDS00_ERM01_Appendices
Software Design and Specification – DS850	2.0	04-04	EVS5200_SDS00_DS850
DS200 Software Design and Specification	4.0	04-05	EVS5200_D_SDS00_DS200
ExpressVote Software Design and Specification	3.0	04-06	EVS5200_D_SDS00_ExpressVote
Software Design and Specification – AutoMARK	1.8	04-07	AutoMARK ESS Software Design Specifications Overview
AutoMARK Operating Software Design Specifications	5.0	04-07-01	AQS-18-5001-002-R
AutoMARK Ballot processing Specifications	3.0	04-07-01	AQS-18-5002-003-S
AutoMARK Software Design Specifications	5.0	04-07-01	AQS-18-5001-004-S
AutoMARK Software Development Environment	5.0	04-07-01	AQS-18-5001-006-R
AutoMARK Software Diagnostics Specifications	5.0	04-07-01	AQS-18-5000-004-F
AutoMARK Embedded Database Interface Specifications	5.0	04-07-01	AQS-18-5002-005-S
AutoMARK Graphical User Interface Specifications	6.0	04-07-01	AQS-18-5001-005-R

D.1 EVS 5.2.0.0 TECHNICAL DATA PACKAGE (CONTINUED)

Table E-1. EVS 5.2.0.0 TDP (Continued)

EVS 5.2.0.0 TDP Documents	Version	Doc No.	Document Code
Software Design and Specification			
AutoMARK Driver API Specifications	5.0	04-07-01	AQS-18-5000-002-F
AutoMARK Programming Specifications Details	5.0	04-07-01	AQS-18-5001-011-R
AutoMARK ESS Software Standards Specification	5.0	04-07-01	AQS-18-4000-000-S
AutoMARK ESS Operations and Diagnostic Log Specs	5.0	04-07-01	AQS-18-5002-004-S
ES&S System Development Program	2.0	04-08	ESSSYS_SG_P_0400_ SystemDevProgram
Coding Standards	3.0	04-09	ESSSYS_D_P_0400_CodingStandards
System Test/Verification Specification			
Voting System Test Plan ES&S Voting System 5.2.0.0	2.0	05-01	EVS5200_QA_D_0500_SysTestPlan
CIF Usability Test Reports – ExpressVote	1.0	05-02-01	ExpressVoteHW_P_D_0509_ CIFRptExpressVote
CIF Usability Test Reports – AutoMARK	1.x	05-02-02	AMVATHW_P_D_0510_CIFRptAMVAT
CIF Usability Test Reports – DS200	1.2.1	05-02-03	DS200HW_P_D_0512_CIFRptDS200
System Security Specification			
Voting System Security Specification	4.0	06-01	EVS5200_CM_SPC00_SysSecuritySpec
Hardening Procedures for the Election System	1.2	06-02	EVS5200_CM_SPC01_ HardeningProcedures
Security Script Description	1.1	06-03	EVS5200_CM_SPC02_SecScriptDesc
AutoMARK System Security Specifications	6.0	06-04	AutoMARK ESS System Security Specification AQS-18-5002-001-S
System Operations Procedure			
Network Setup Guide	1.2	07-01	EVS5200_CM_SOP_ NetworkConfigGuide
AutoMARK System Operator's Guide	4.0	07-02	EVS5200_DOC_SOP_AMVAT
DS200 Operator's Guide	6.00	07-03	EVS5200_DOC_SOP_DS200
DS850 Operator's Guide	4.0	07-04	EVS5200_DOC_SOP_DS850
EVS Event Logging Service	3.0	07-05	EVS5200_DOC_SOP_ELS
Election Reporting Manager User's Guide	7.0	07-06	EVS5200_DOC_SOP_ERM
ElectionWare Volume I: Administrator's Guide	4.0	07-07	EVS5200_DOC_SOP_EW01Admin
ElectionWare Volume II: Define User's Guide	5.0	07-08	EVS5200_DOC_SOP_EW02Define
ElectionWare Volume III: Design User's Guide	3.0	07-09	EVS5200_DOC_SOP_EW03Design
ElectionWare Volume IV: Deliver User's Guide	4.0	07-10	EVS5200_DOC_SOP_EW04Deliver
ElectionWare Volume V: Results User's Guide	3.0	07-11	EVS5200_DOC_SOP_EW05Results
ExpressPass Operator's Guide	4.0	07-12	EVS5200_DOC_SOP_ExpressPass
ExpressVote Operator's Guide	4.0	07-13	EVS5200_DOC_SOP_ExpressVote

D.1 EVS 5.2.0.0 TECHNICAL DATA PACKAGE (CONTINUED)

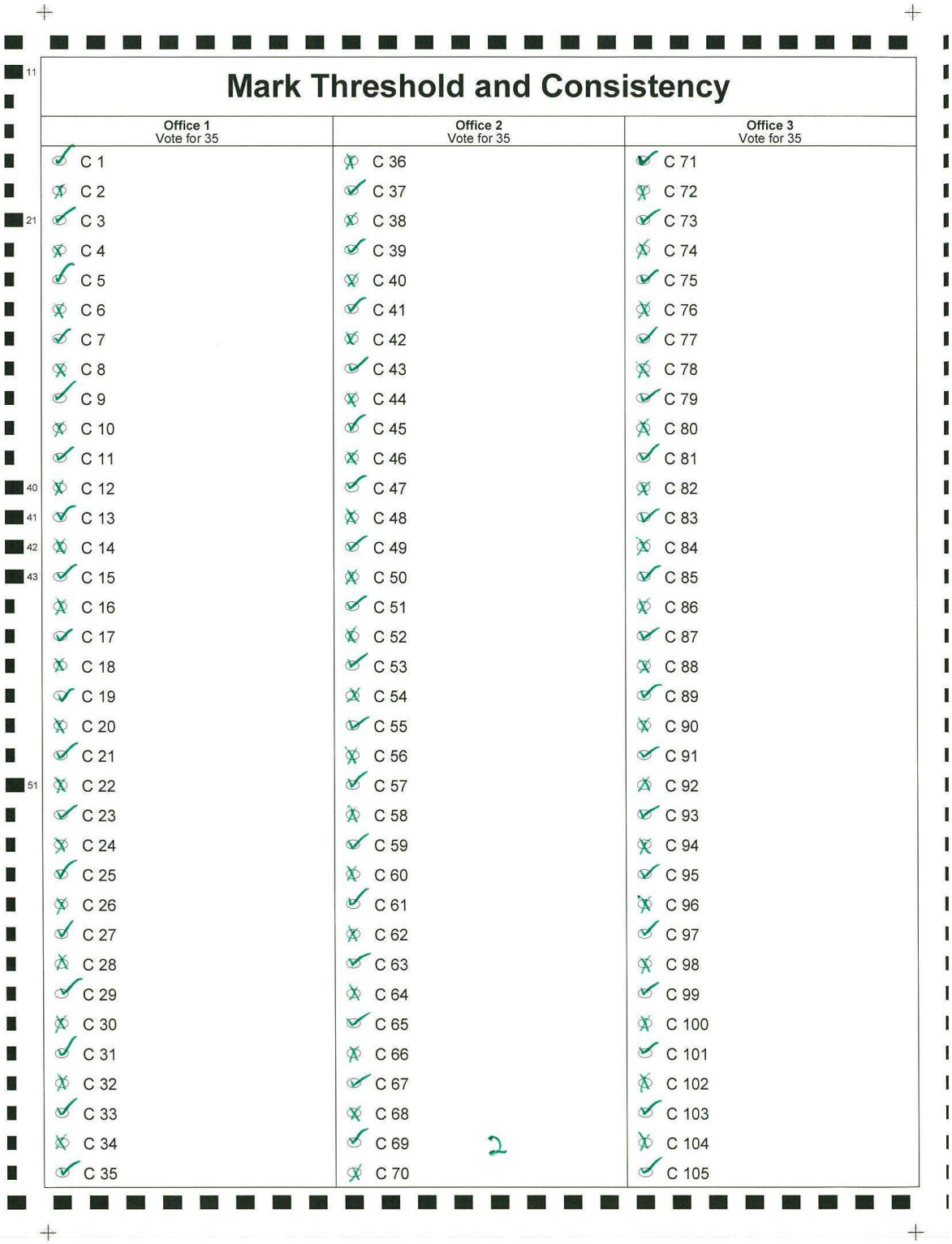
Table E-1. EVS 5.2.0.0 TDP (Continued)

System Maintenance Manuals			
AutoMARK System Maintenance Manual	2.1	08-01	EVS5200_DOC_SMM_AMVAT
DS200 Maintenance Guide	2.0	08-02	EVS5200_DOC_SMM_DS200
DS850 Maintenance Guide	3.0	08-03	EVS5200_DOC_SMM_DS850
ExpressVote Maintenance Guide	2.3	08-04	EVS5200_DOC_SMM_ExpressVote
Personnel Deployment and Training			
Personnel Deployment and Training Program	3.0	09-01	ESSSYS_T_D_0900_TrainingProgram
Configuration Management Plan			
Configuration Management Plan	2.0	10-1	ESSSYS_CM_P_1000_CMProgram
ES&S Technical Documentation Program	5.0	10-2	ESSSYS_DOC_P_1000_TDProgram
QA Program			
Manufacturing Quality Assurance Plan	2.0	11-01	ESSSYS_M_P_1100_MNFQuality AssurancePlan
ES&S 1.3 Hardware DS200 Acceptance Checklist	A	11-01-01	1 3 Hardware DS200_AccptChklst_001RevA
DS850 Acceptance checklist	D	11-01-01	850_AccptChklst_revD
DS850 Onsite Acceptance Checklist	B	11-01-01	850_OAccptChklst_revB
Acceptance Checklist AutoMARK Voter Assist Terminal	A	11-01-01	AutoMARK_AccptChklst_001_Rev.A
AutoMARK QC Checklist	A	11-01-01	AutoMARK_QC_Chklst_001Rev.A
ES&S DS200 Acceptance Checklist	D	11-01-01	DS200_AccptChklst_001RevD
ES&S ExpressVote Acceptance Checklist	B	11-01-01	ExpressVote_AccptChcklst_001Rev B
Software Quality Assurance Program	2.0	11-02	ESSSYS_QA_P_1100_SoftwareQuality AssuranceProgram
ES&S Software/Firmware Acceptance	2.0	11-02-01	ESSSYS_QA_L_1100_SoftwareFirmwar eAcceptance
System Change Notes			
System Change Notes	10.0	12-01	EVS5200_DOC_D_1200_ChangeNotes
Other TDP Documents			
ES&S Ballot Production Guide	2.1	13-01	EVS5200_DOC_SOP_11_BPG

APPENDIX E – MARK CONSISTENCY AND THRESHOLD BALLOTS

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS

The following figures represent the ballots used for the mark consistency and threshold test.

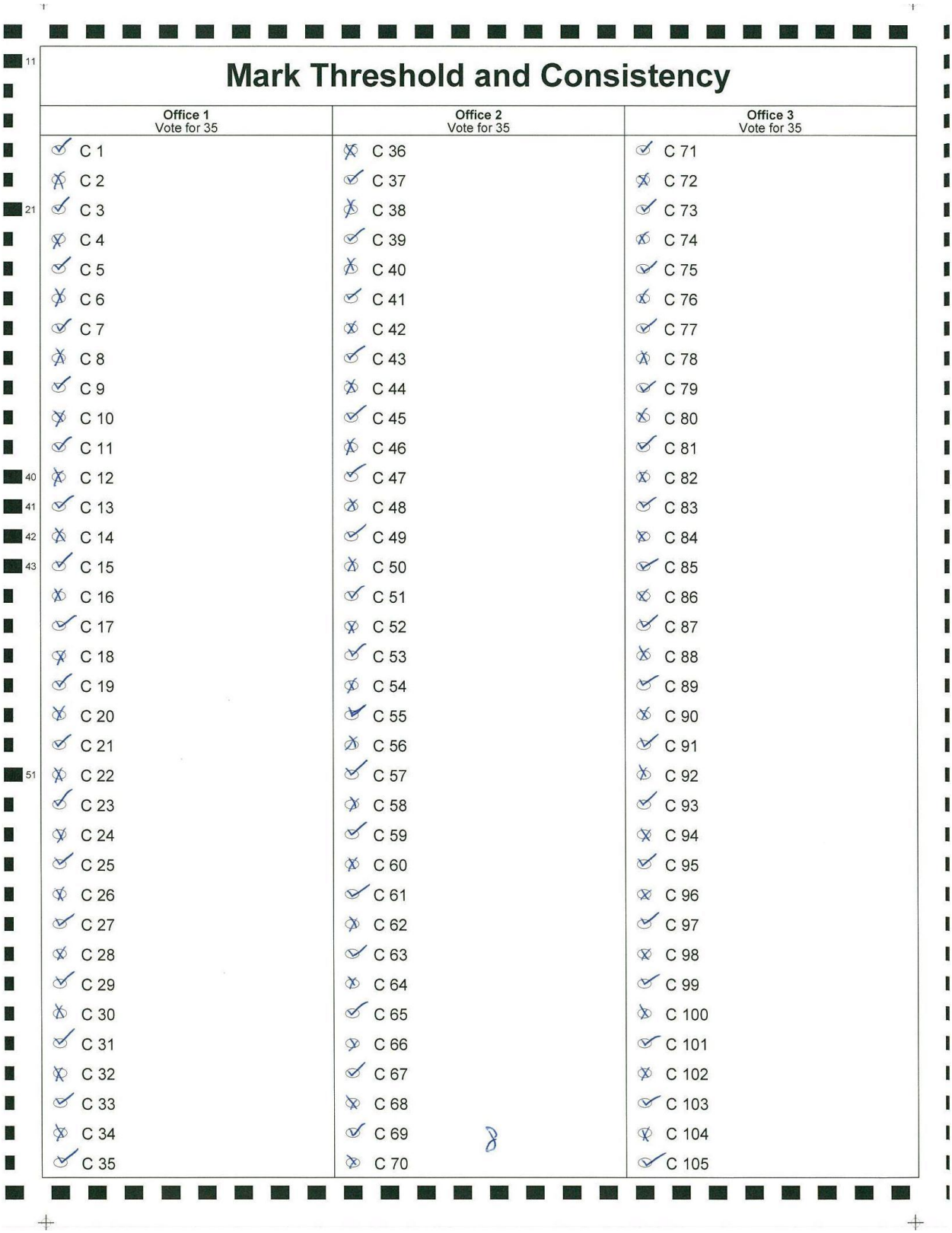


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-1. Hand Marked Ballot Sample – Green Color Value Pen Ink with Alternating Marking Method

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

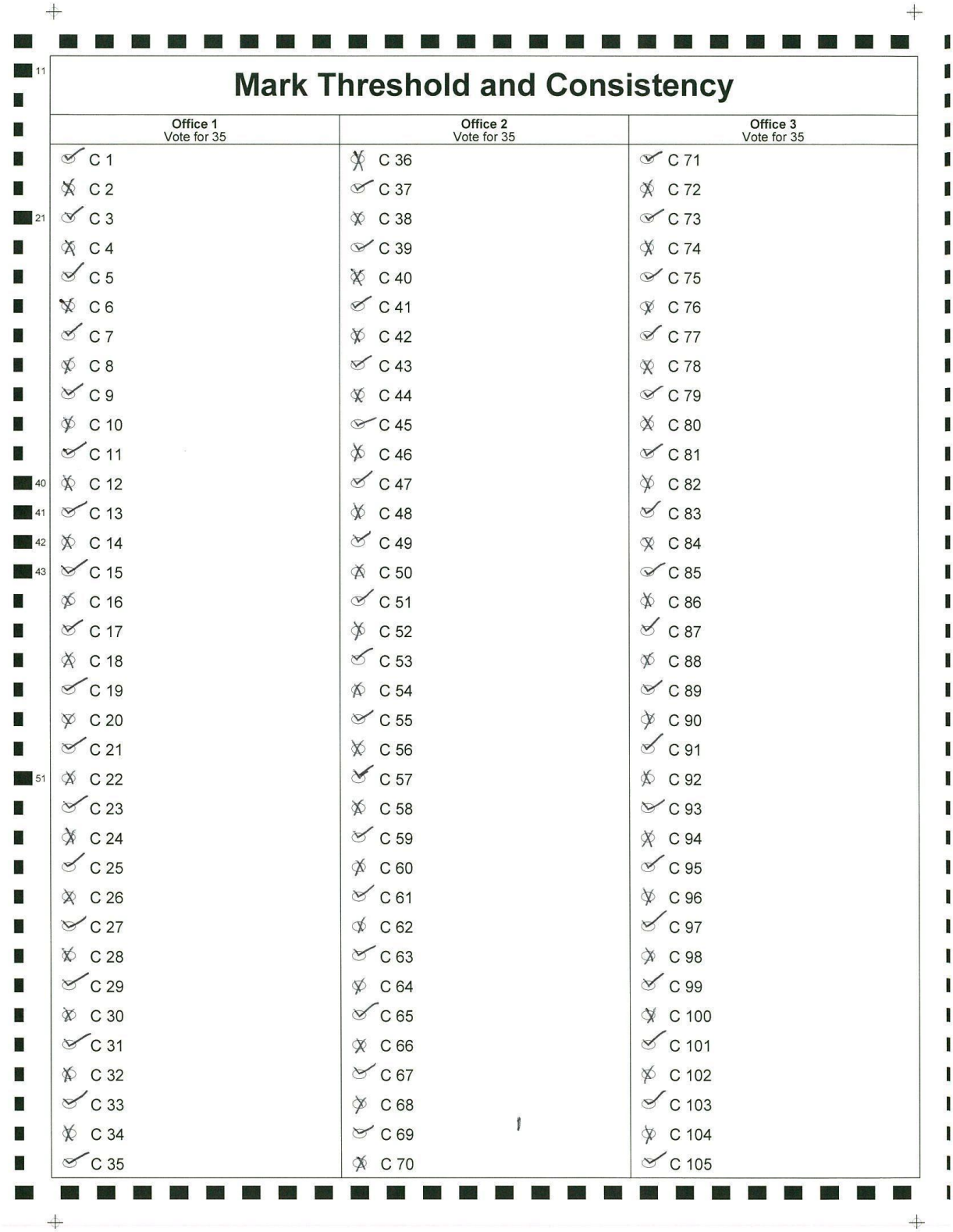


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-2. Hand Marked Ballot Sample – Blue Color Value Pen Ink with Alternating Marking Method

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

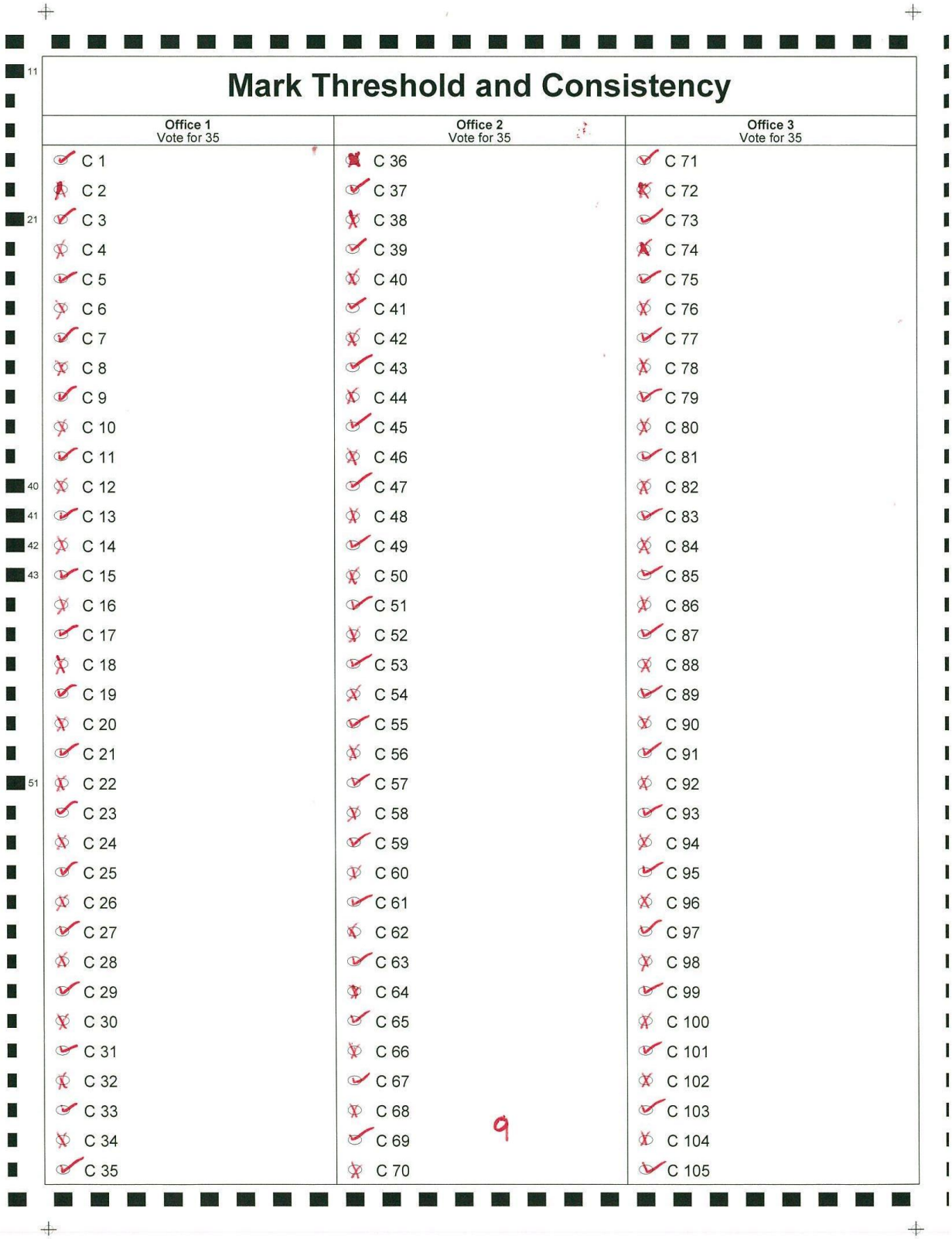


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-3. Hand Marked Ballot Sample – Black Color Value Pen Ink with Alternating Marking Method

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

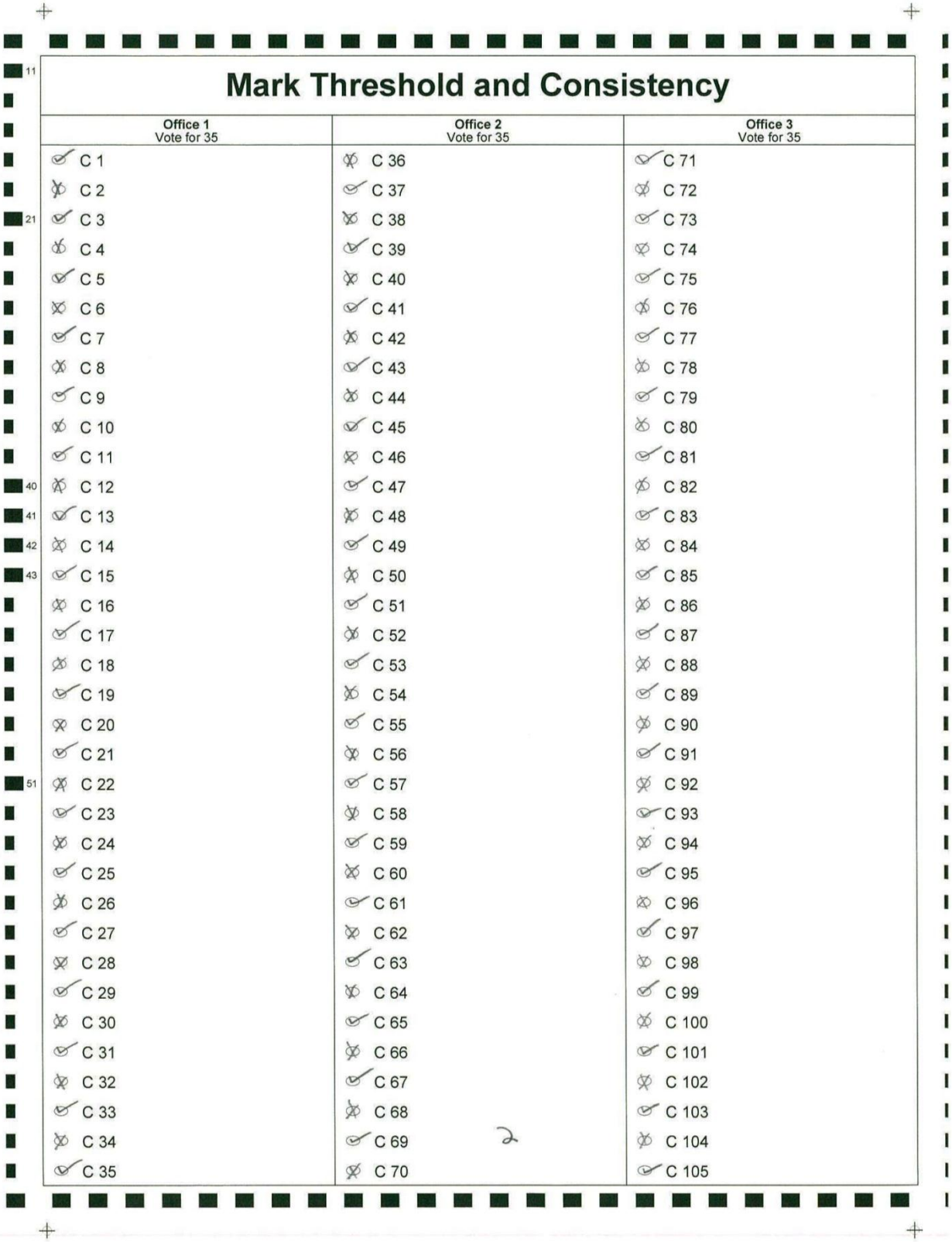


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-4. Hand Marked Ballot Sample – Red Color Value Pen Ink with Alternating Marking Method

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

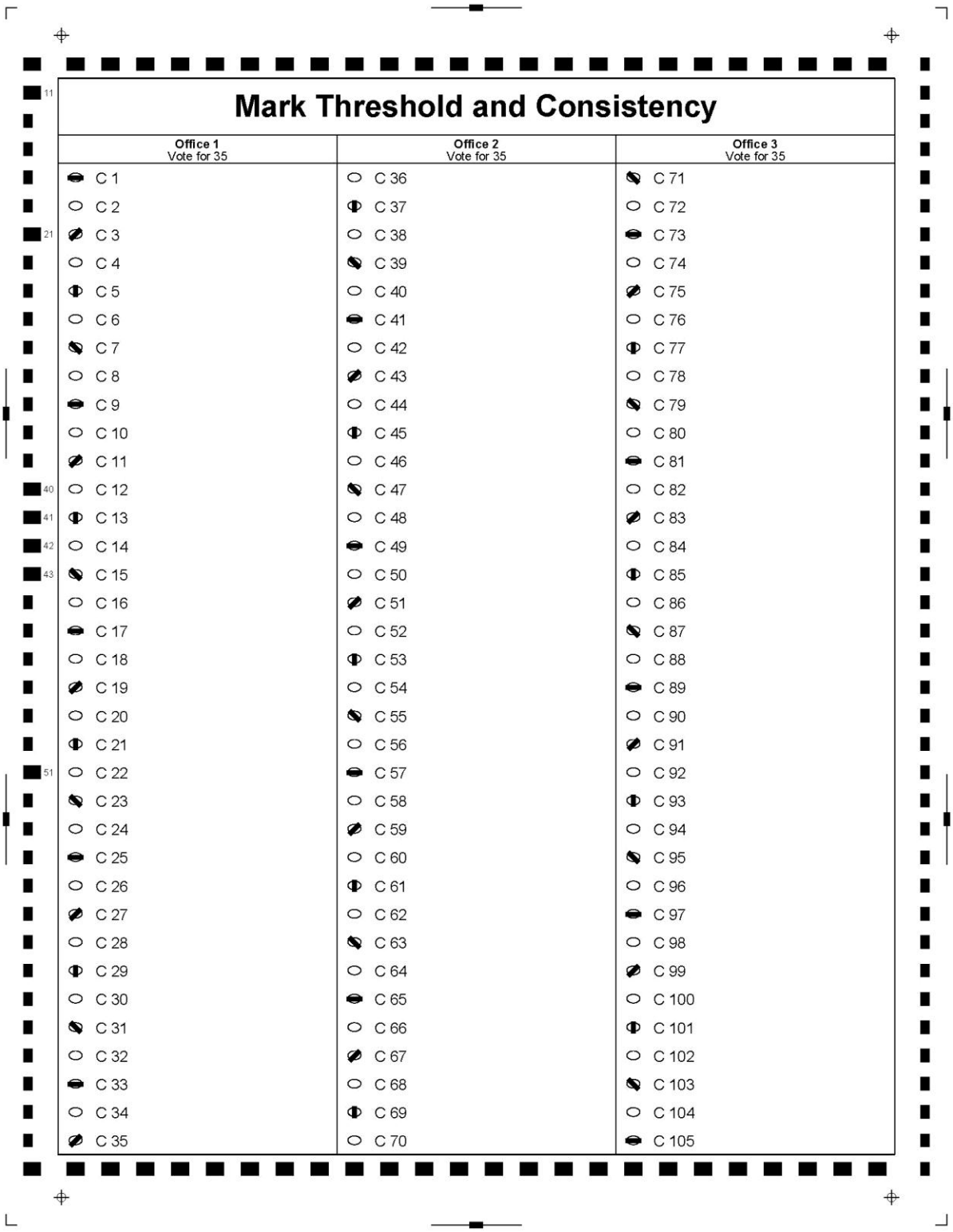


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-5. Hand Marked Ballot Sample – Number Two Pencil with Alternating Marking Method

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

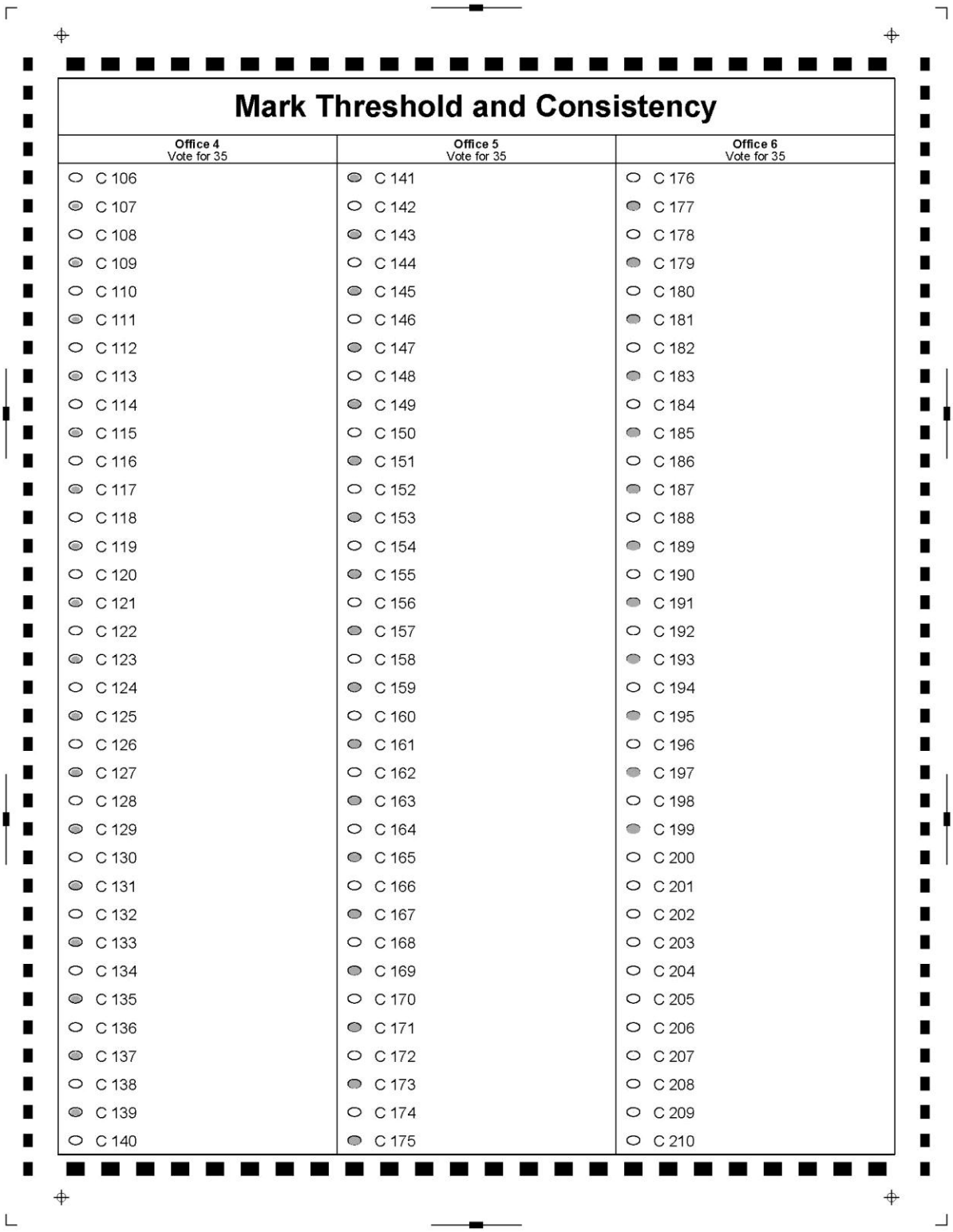


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-6. Computer Marked Ballot Sample – Black 1 millimeter line rotating 45º marking method

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

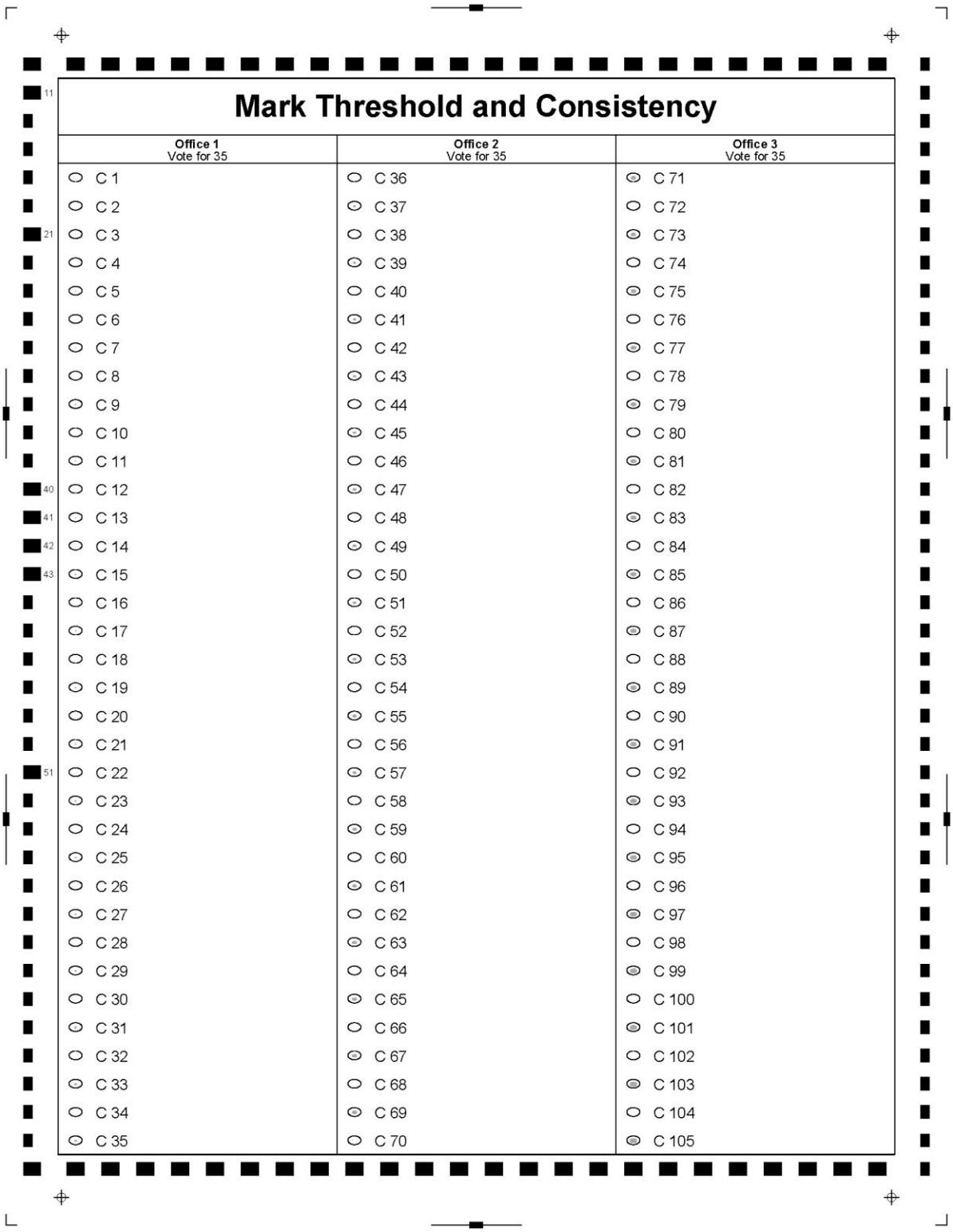


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-7. Computer Marked Ballot Sample – Dark Gray 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

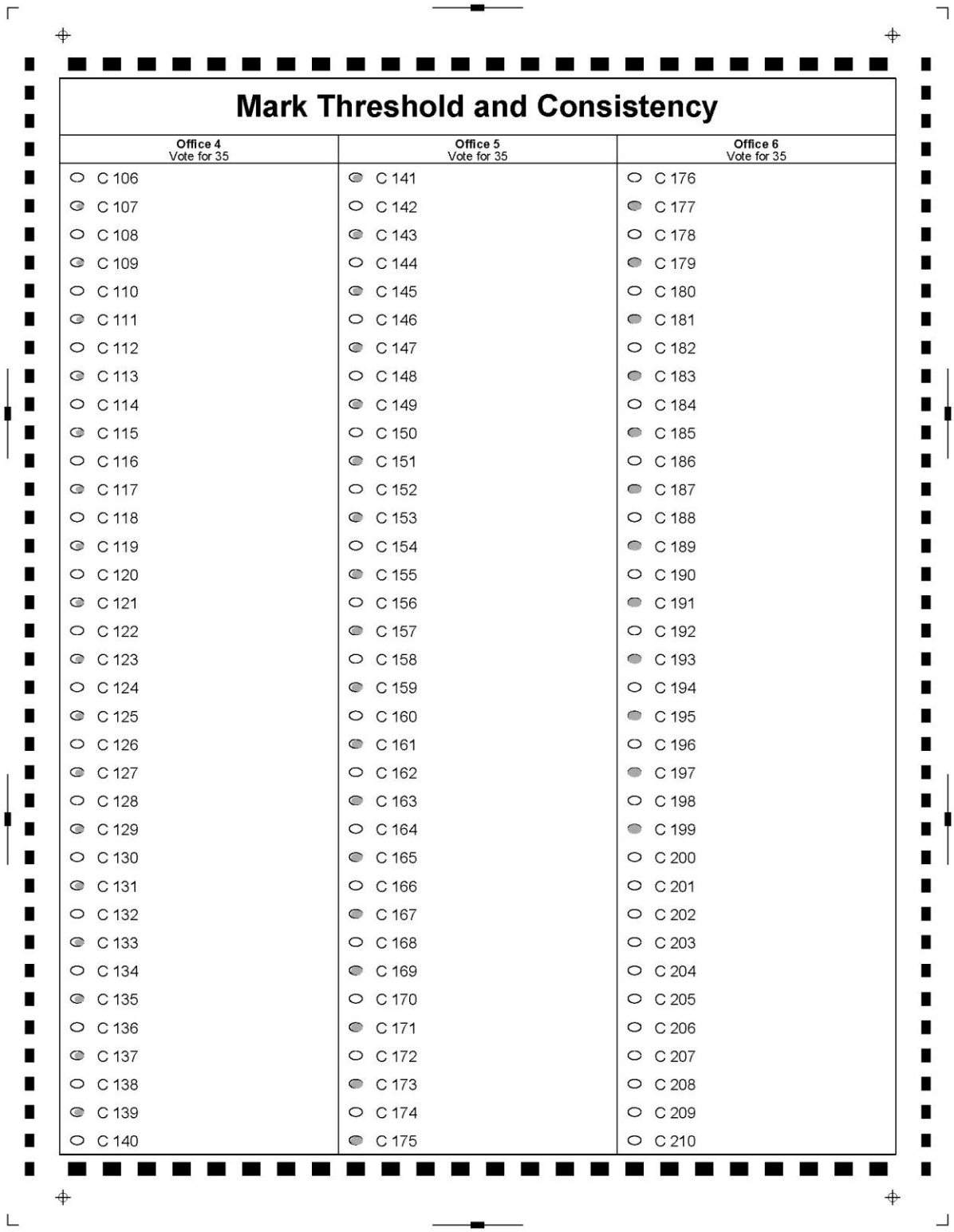


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-8. Computer Marked Ballot Sample – Dark Gray 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

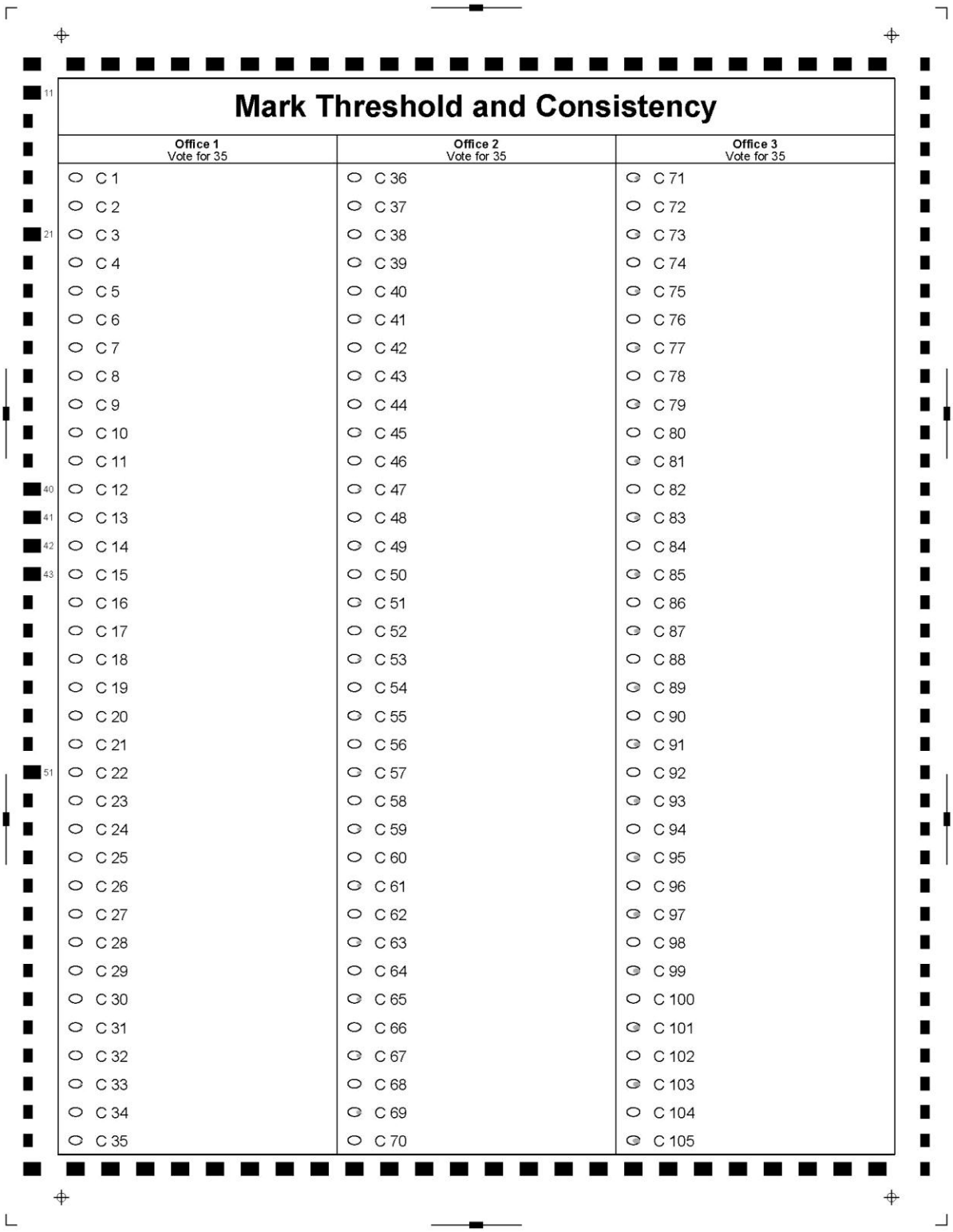


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-9. Computer Marked Ballot Sample – Dark Gray 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

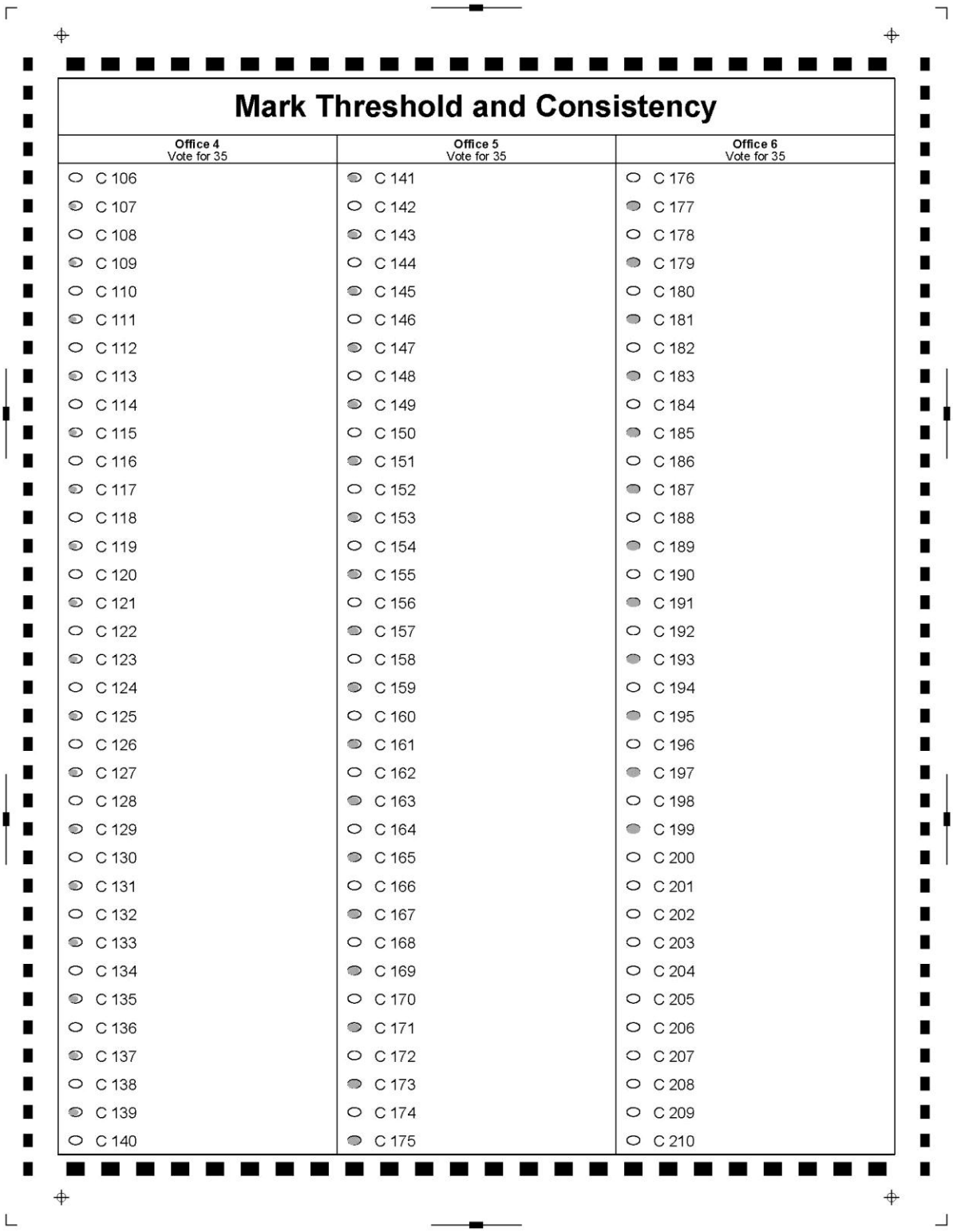


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-10. Computer Marked Ballot Sample – Dark Gray 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

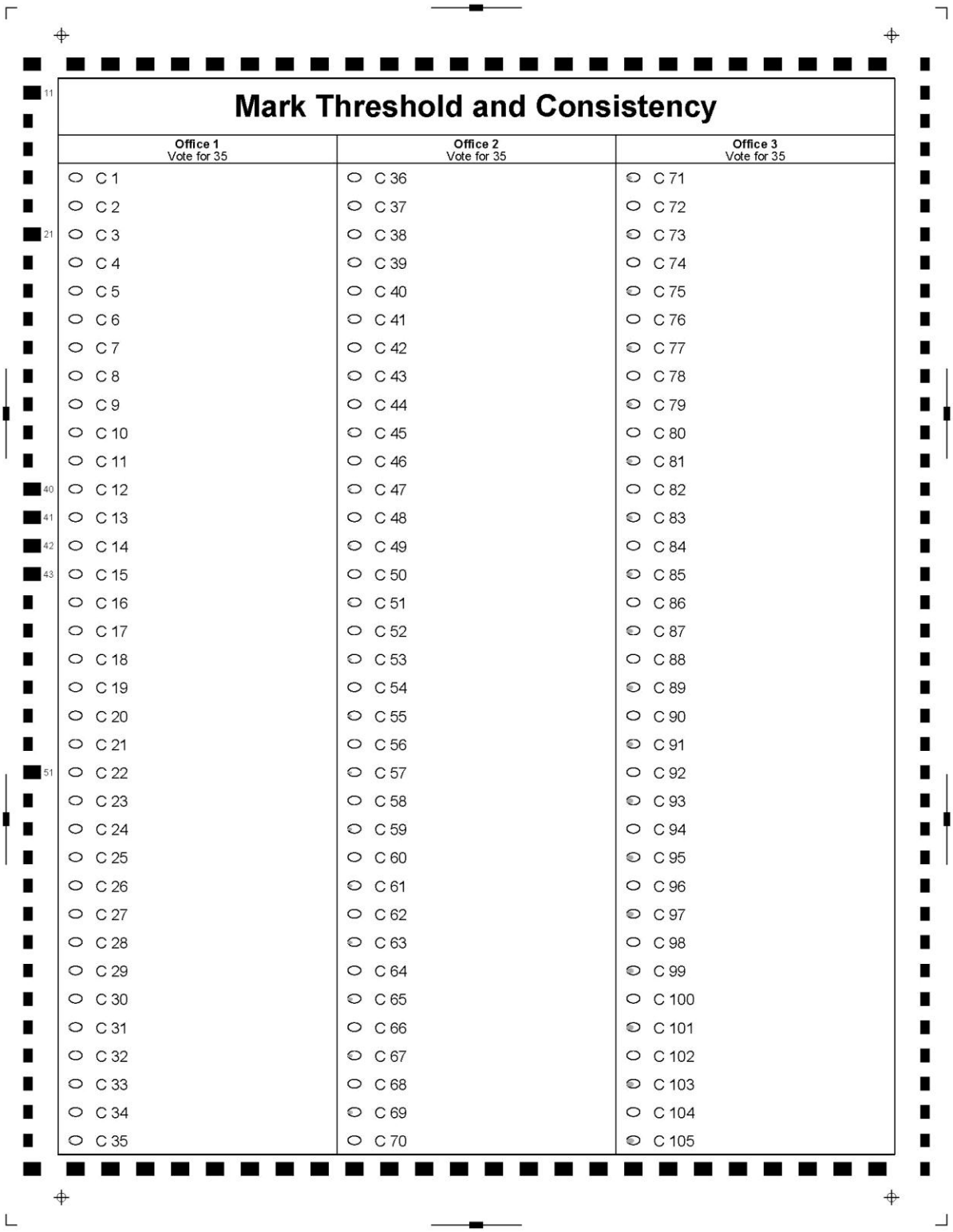


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-11. Computer Marked Ballot Sample – Dark Gray 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

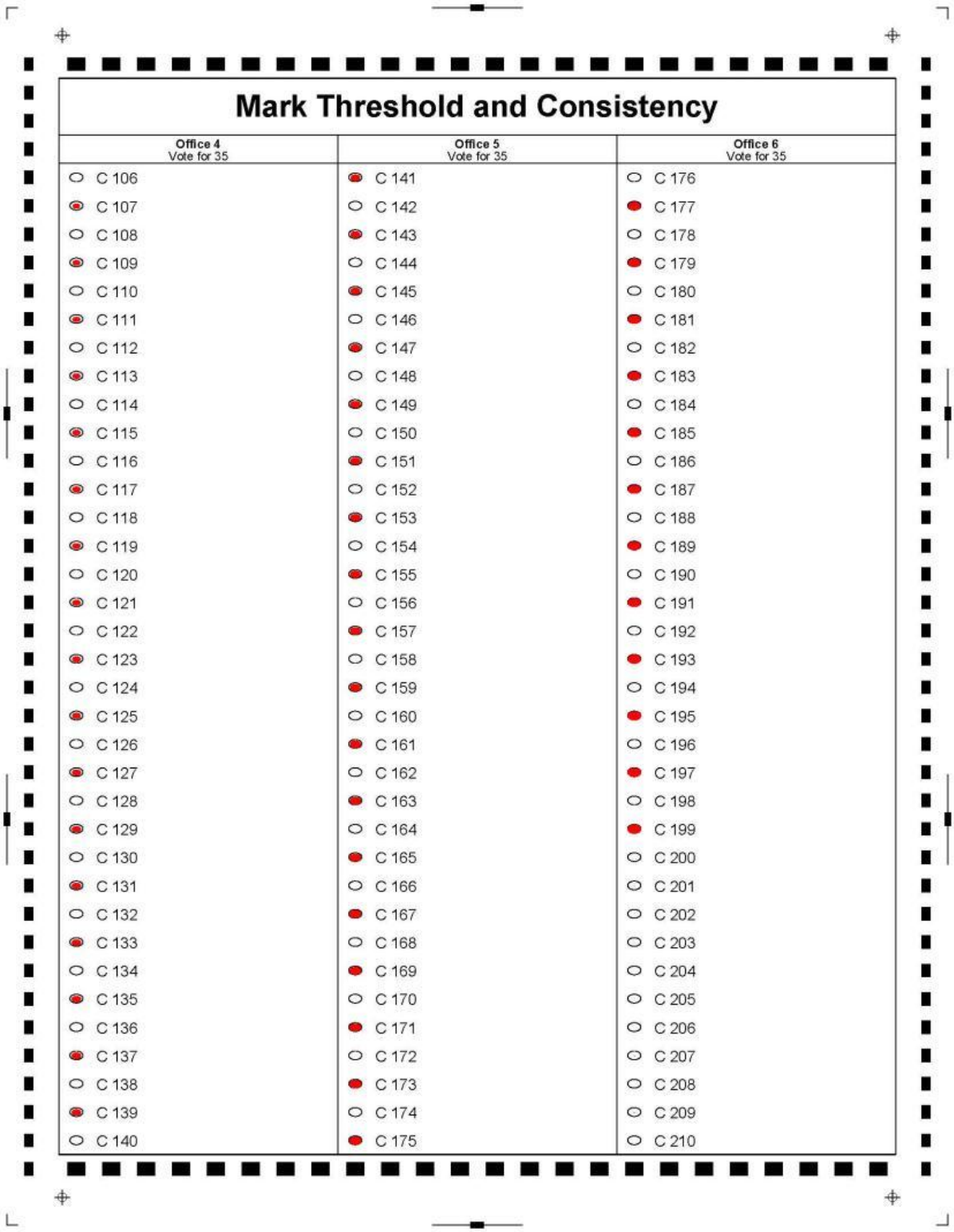


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-12. Computer Marked Ballot Sample – Dark Gray 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

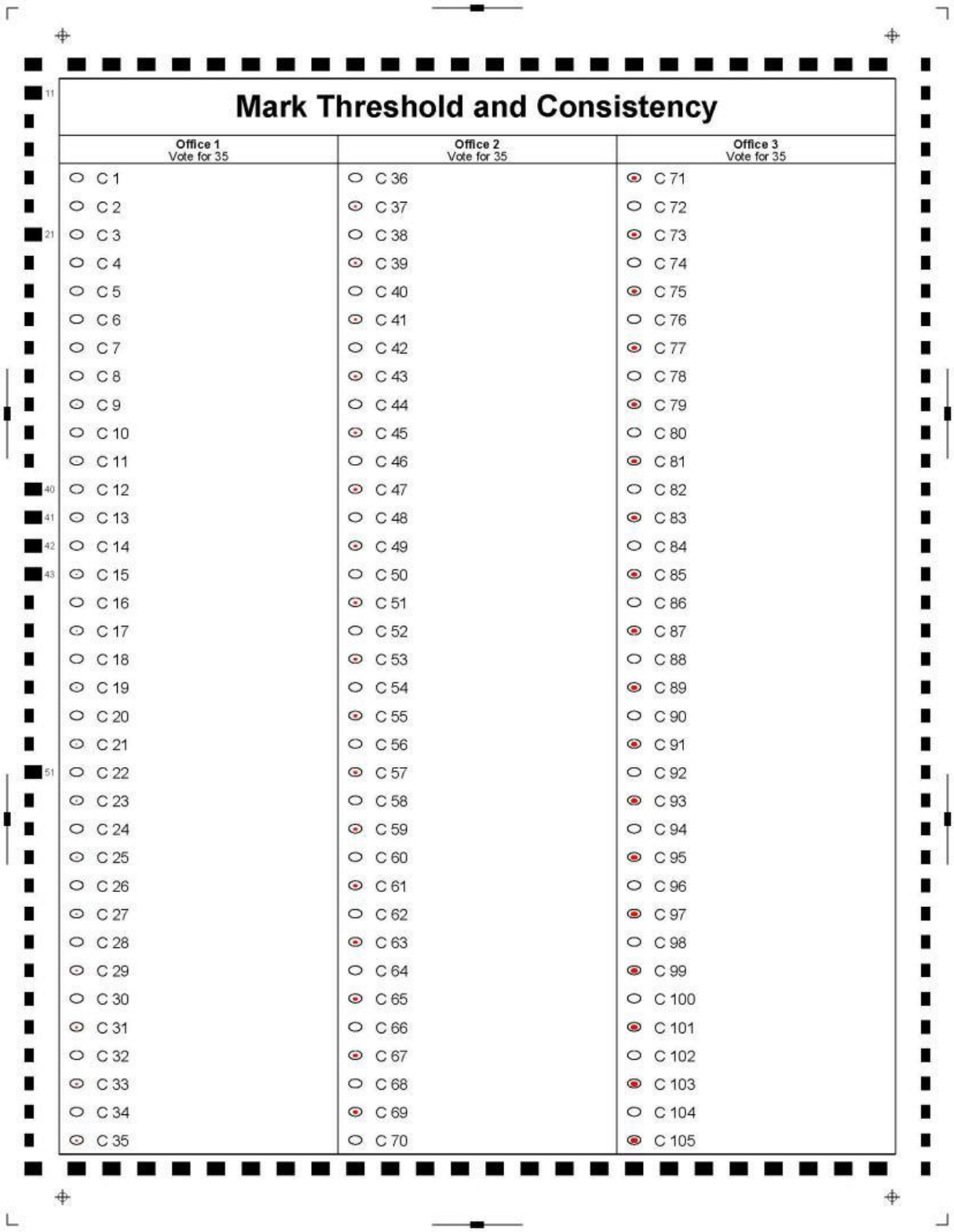


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-13. Computer Marked Ballot Sample – Red 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

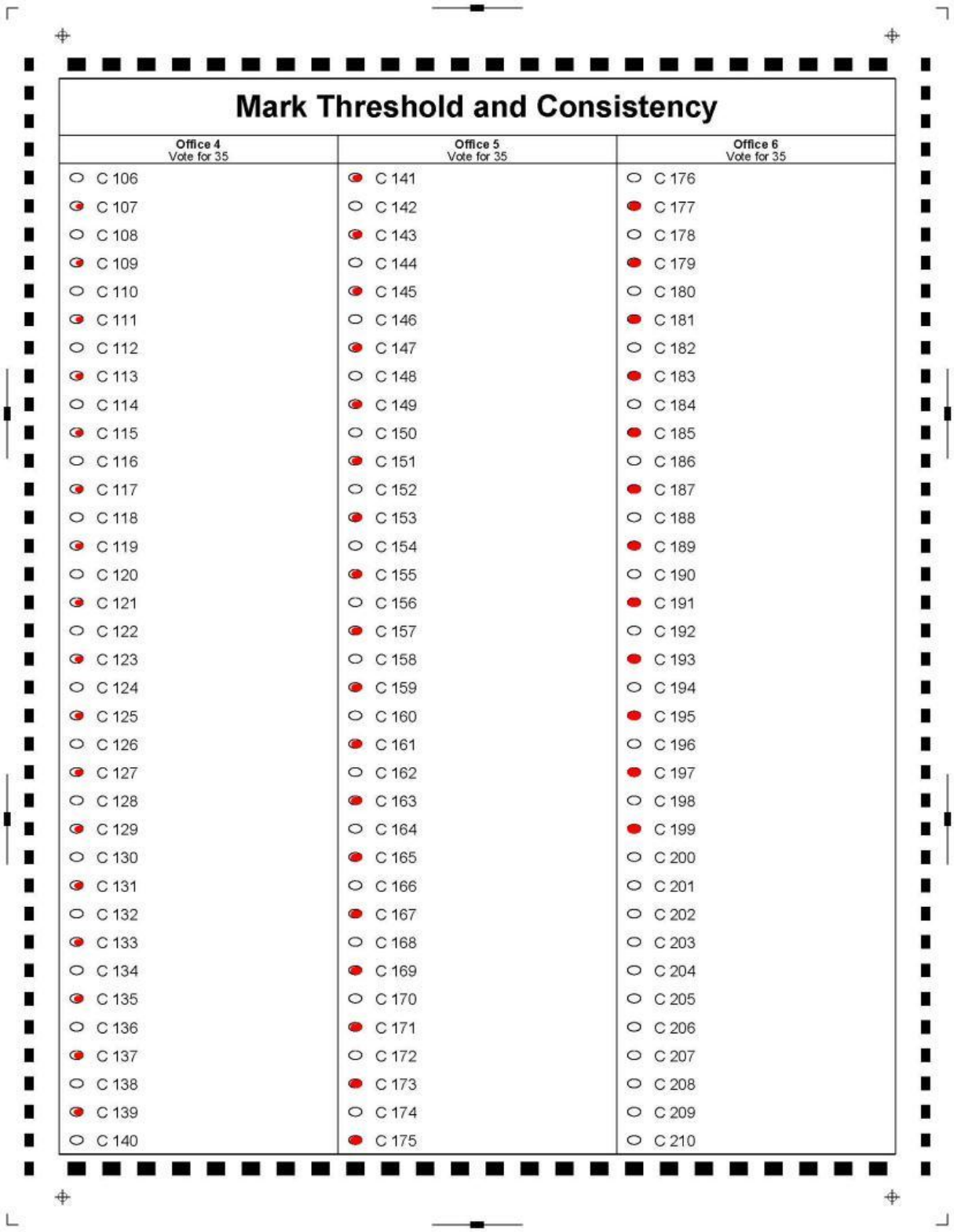


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-14. Computer Marked Ballot Sample – Red 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

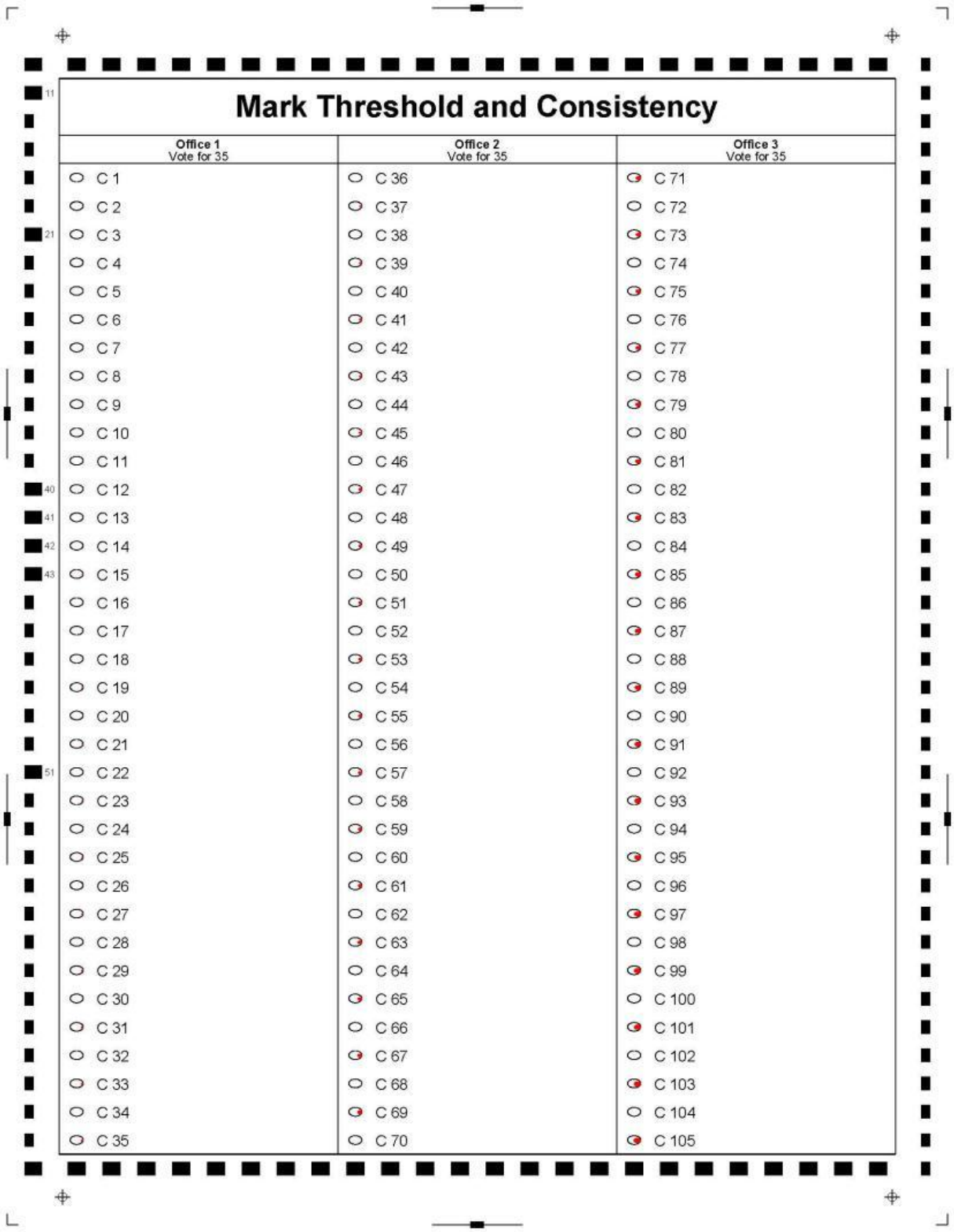


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-15. Computer Marked Ballot Sample – Red 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

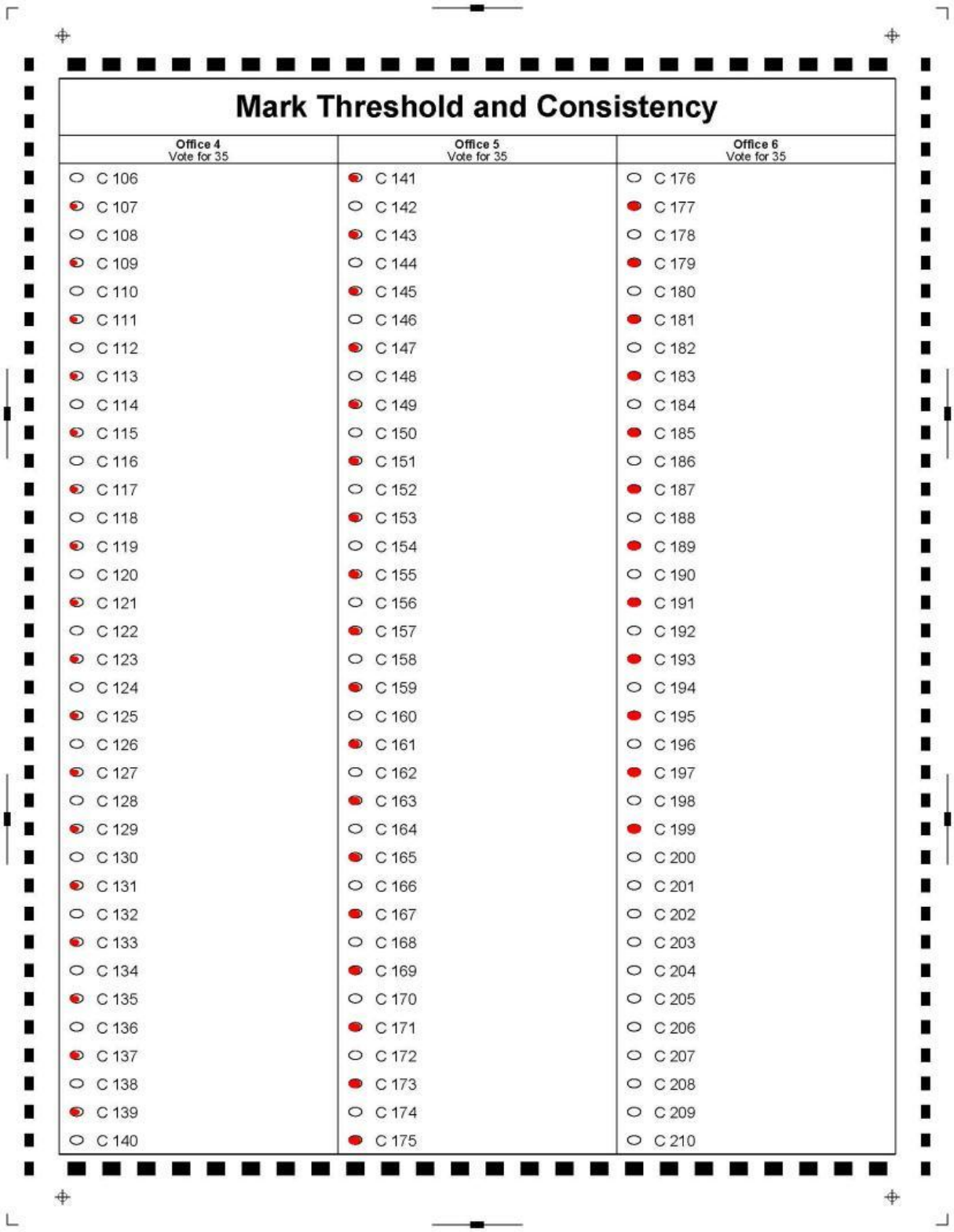


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-16. Computer Marked Ballot Sample – Red 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

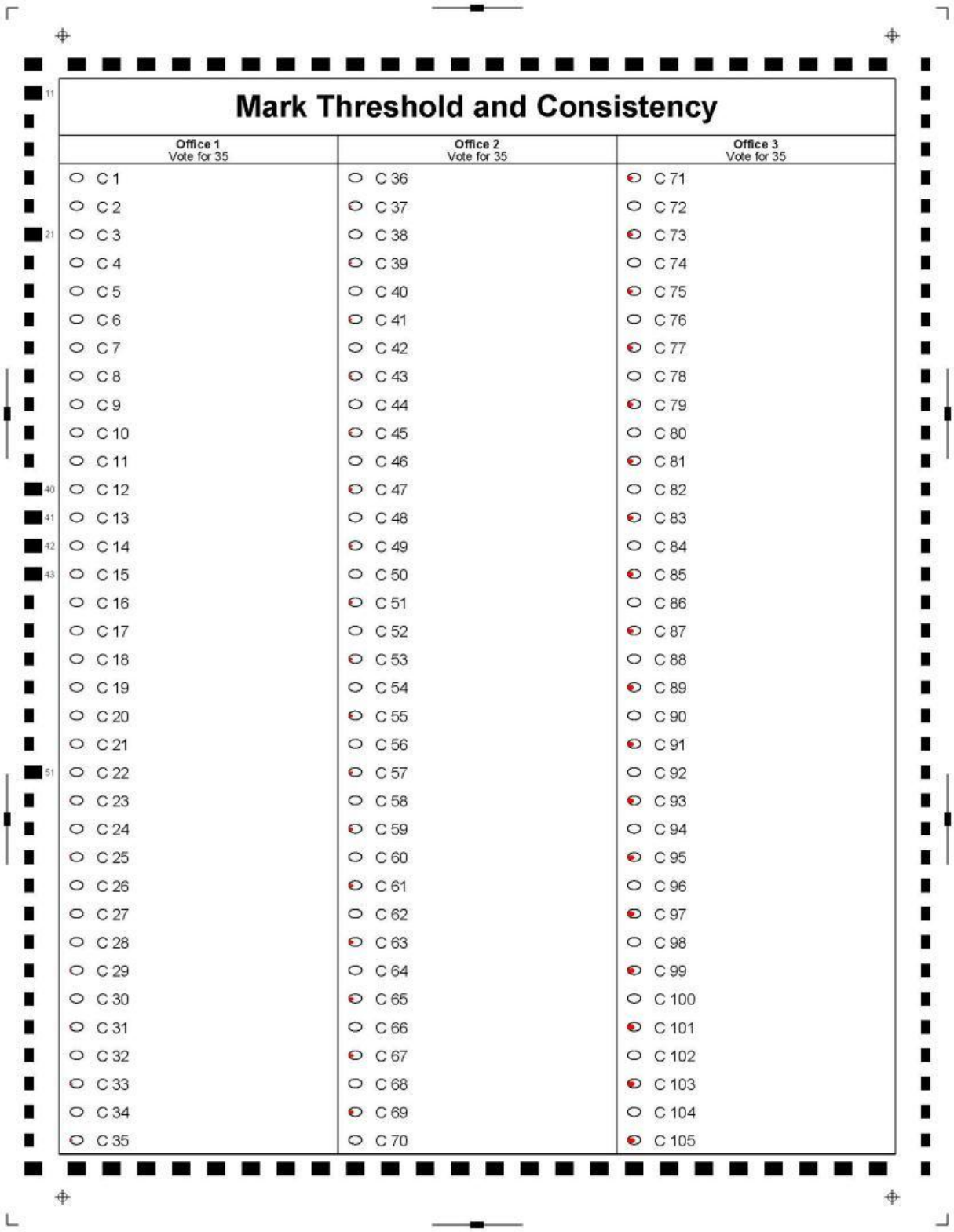


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-17. Computer Marked Ballot Sample – Red 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

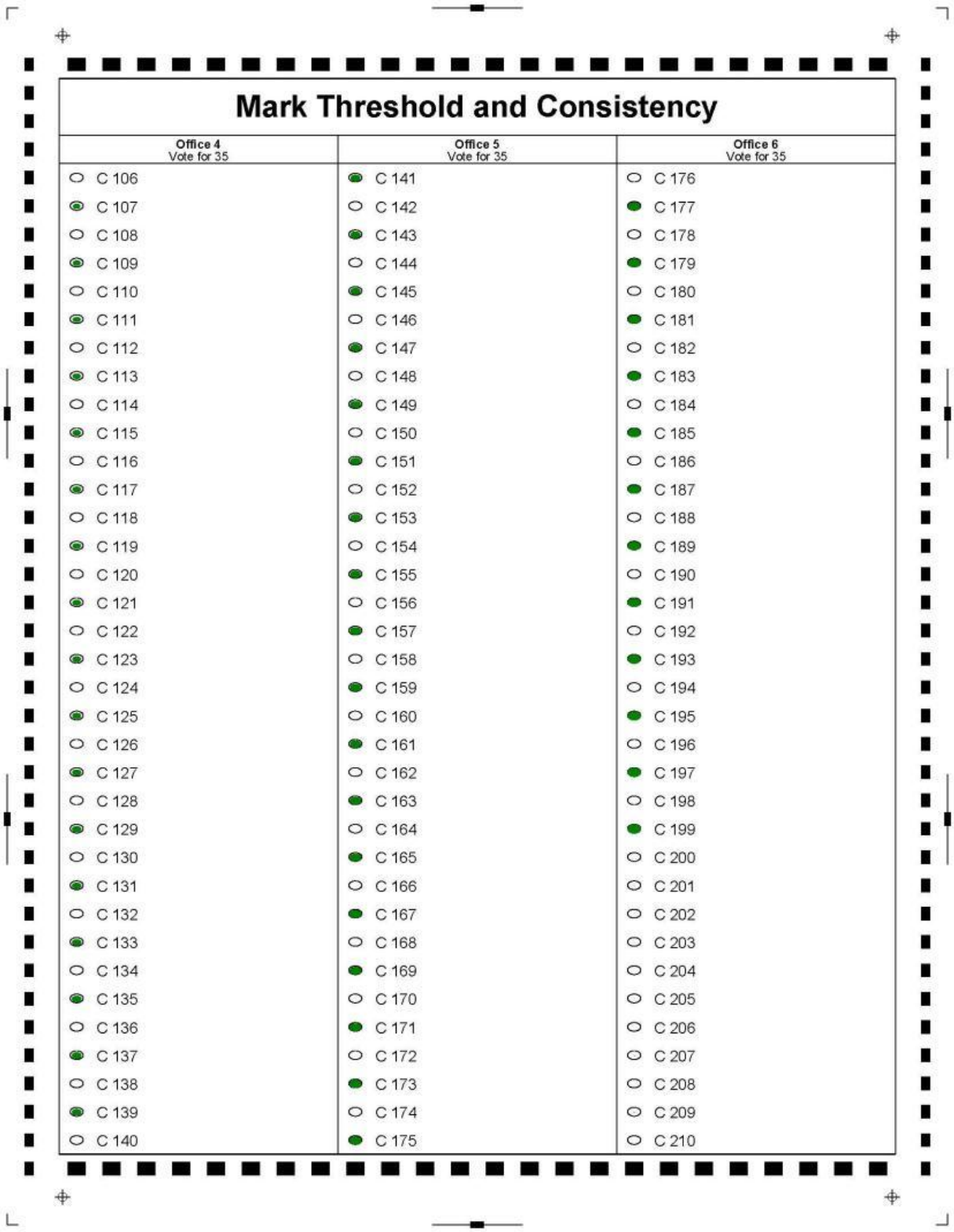


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-18. Computer Marked Ballot Sample – Red 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

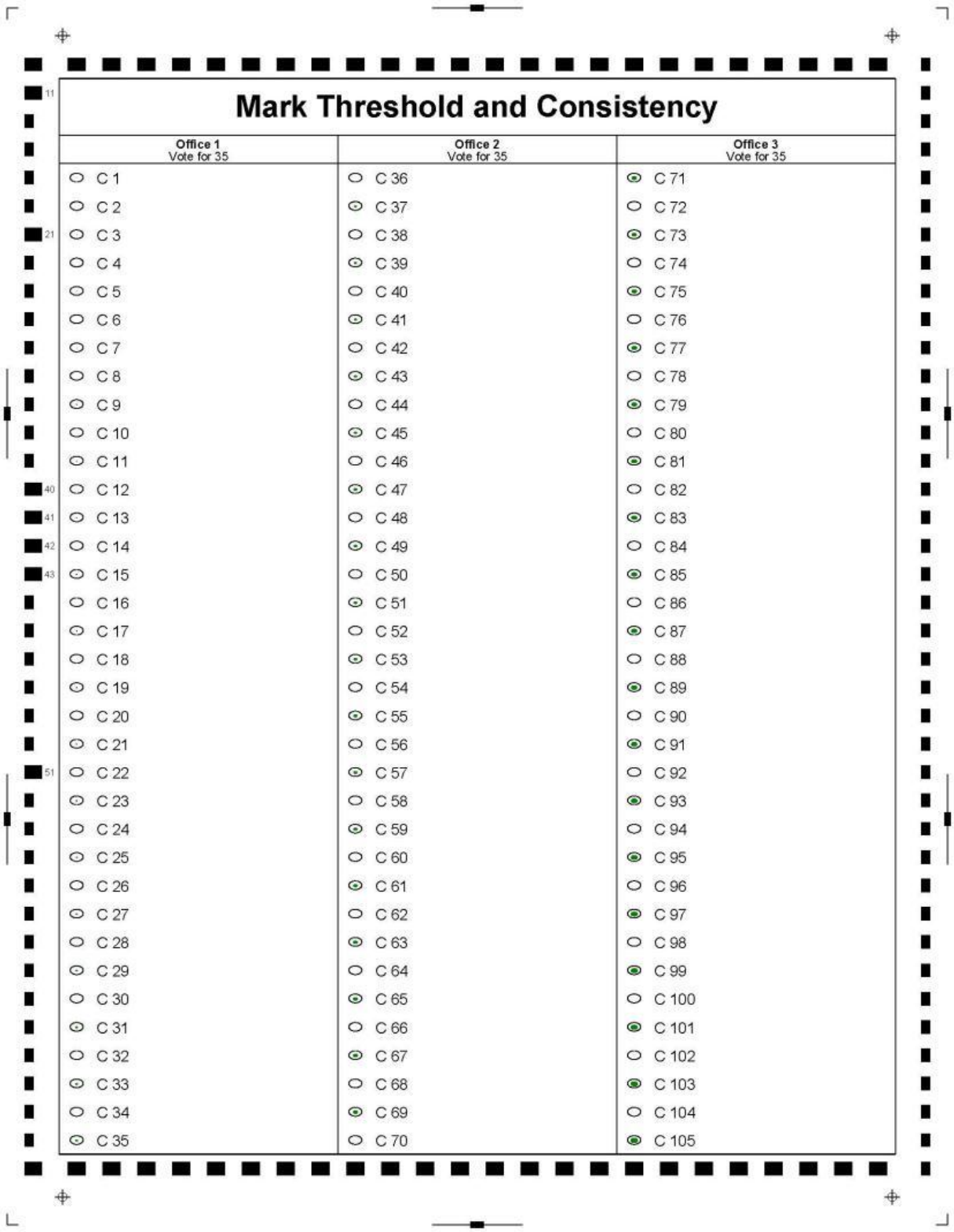


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-19. Computer Marked Ballot Sample – Green 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

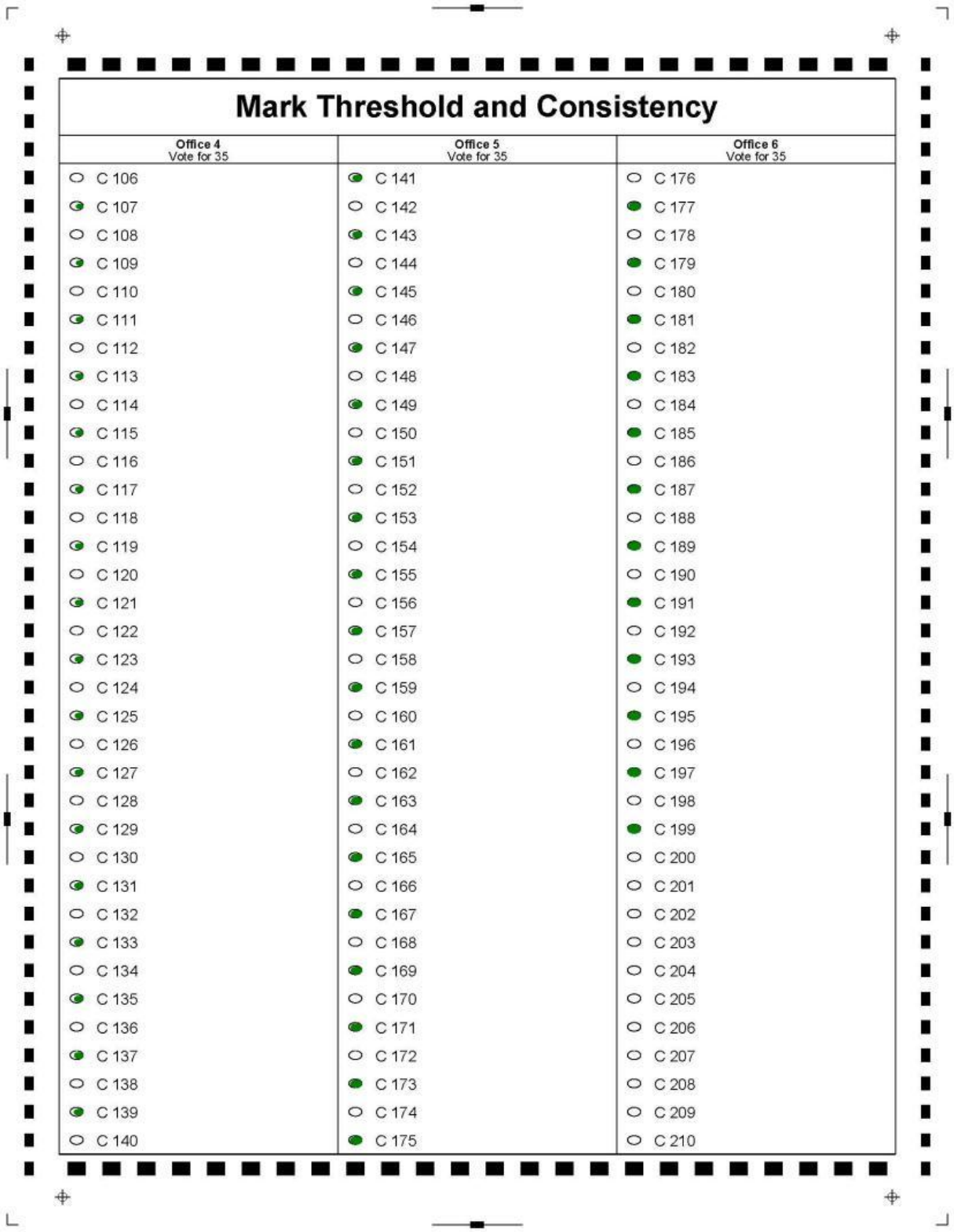


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-20. Computer Marked Ballot Sample – Green 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

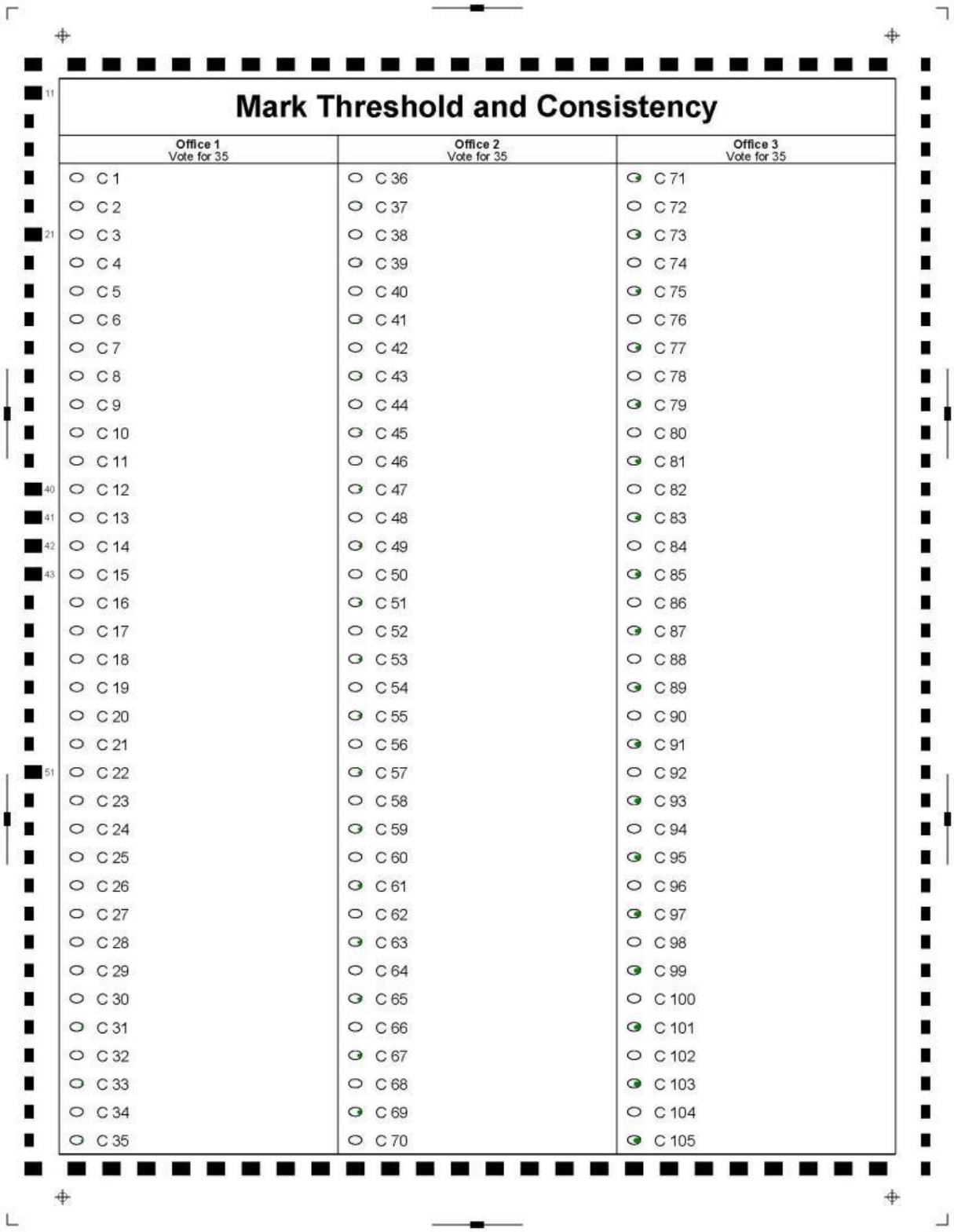


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-21. Computer Marked Ballot Sample – Green 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

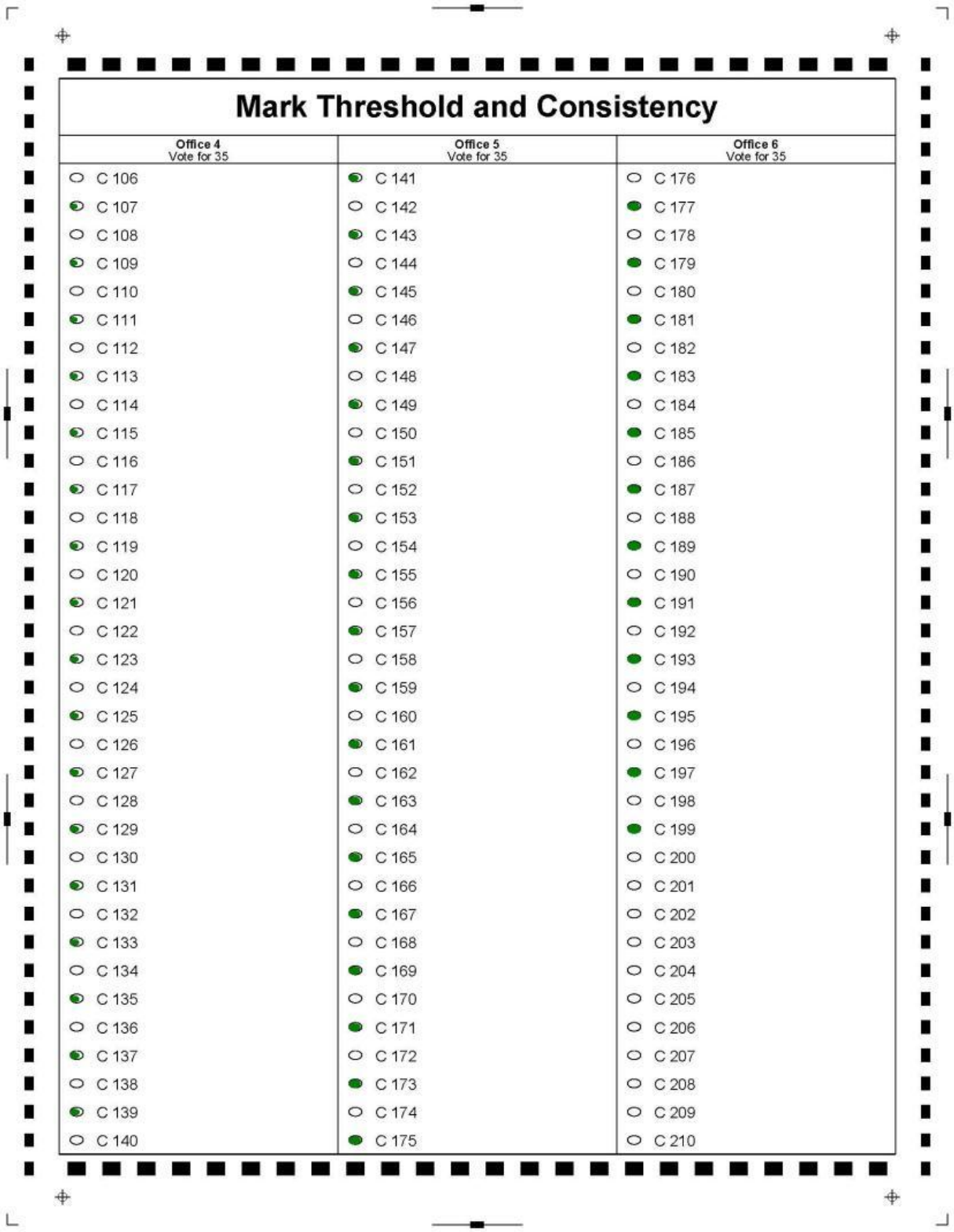


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-22. Computer Marked Ballot Sample – Green 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

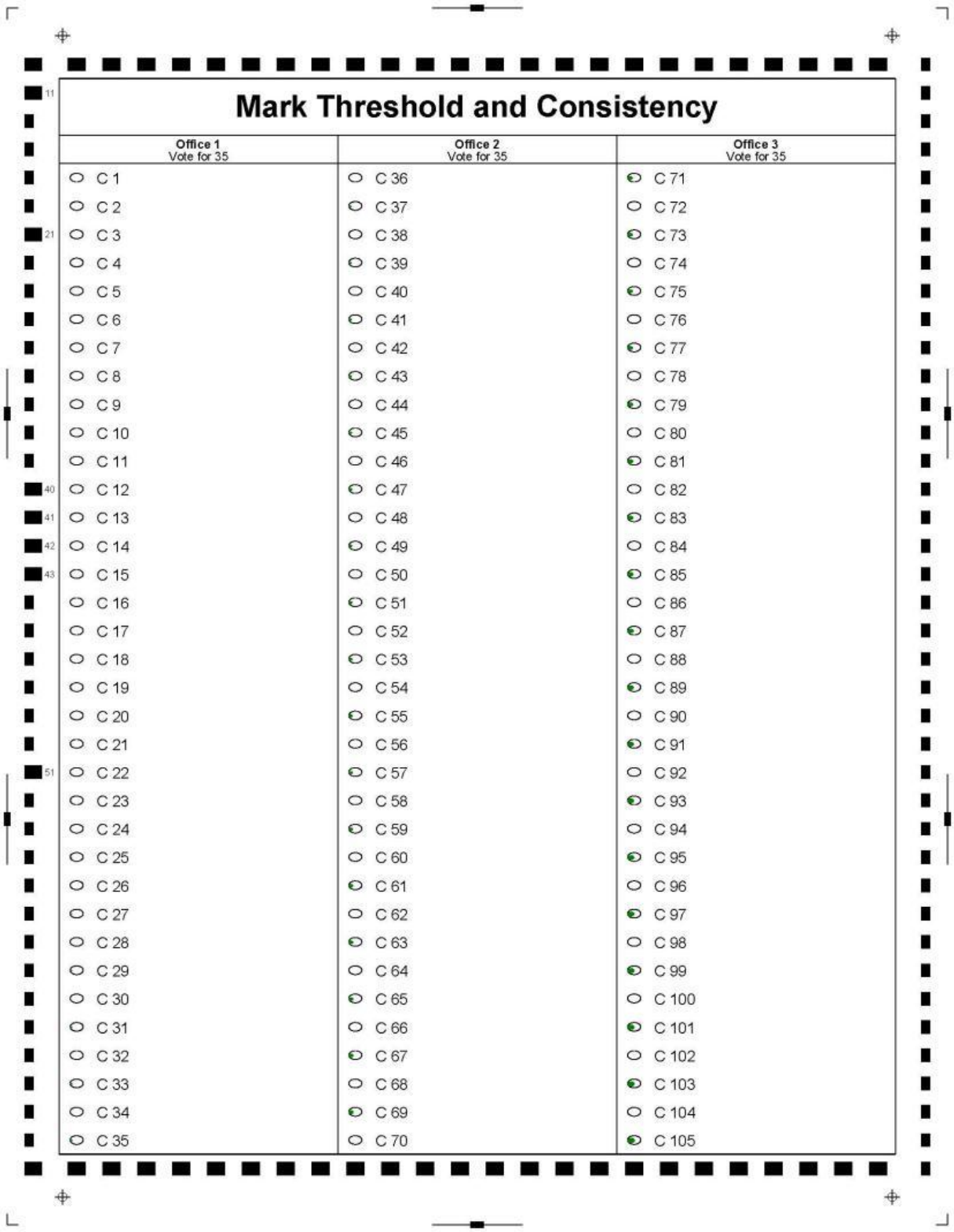


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-23. Computer Marked Ballot Sample – Green 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

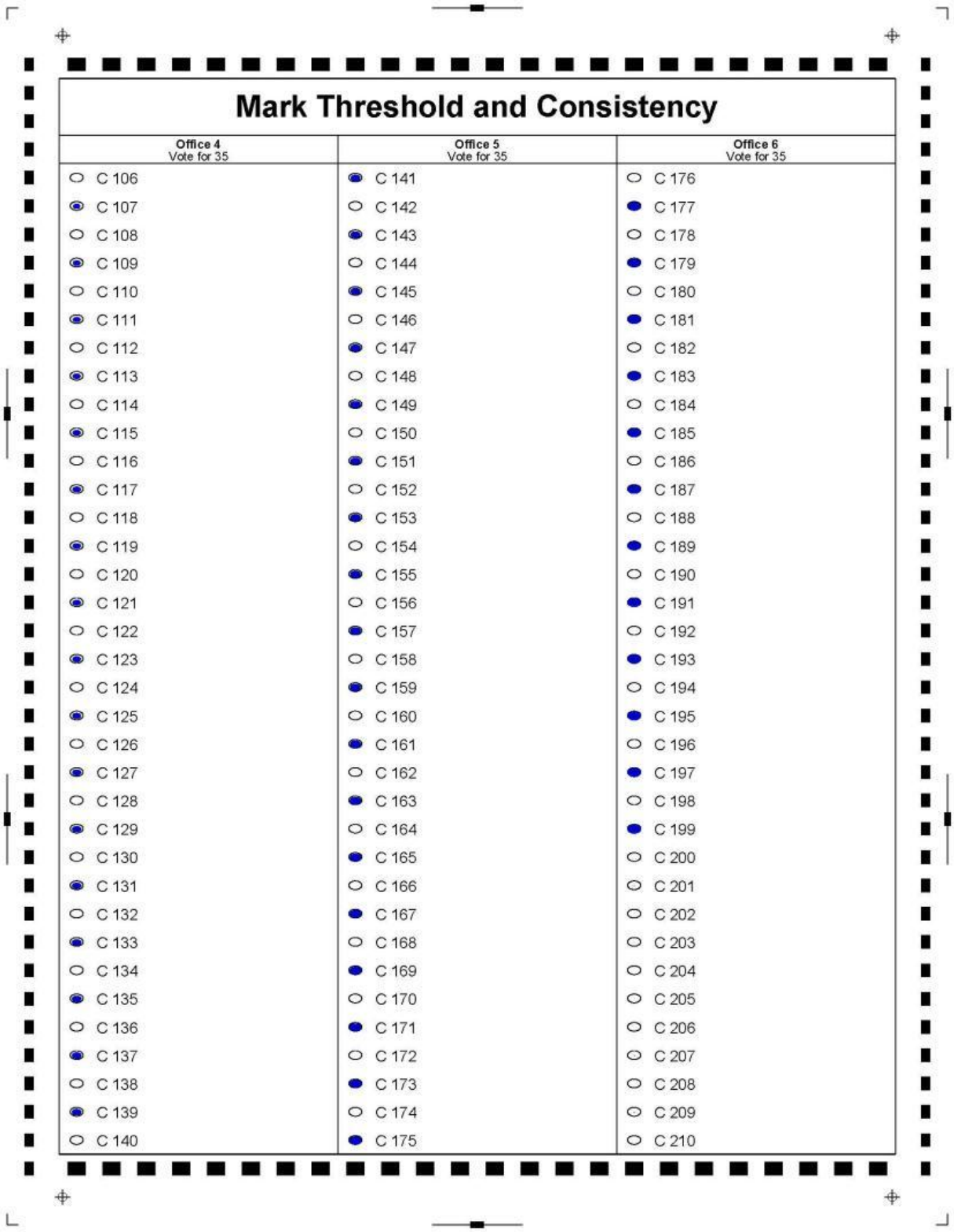


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-24. Computer Marked Ballot Sample – Green 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

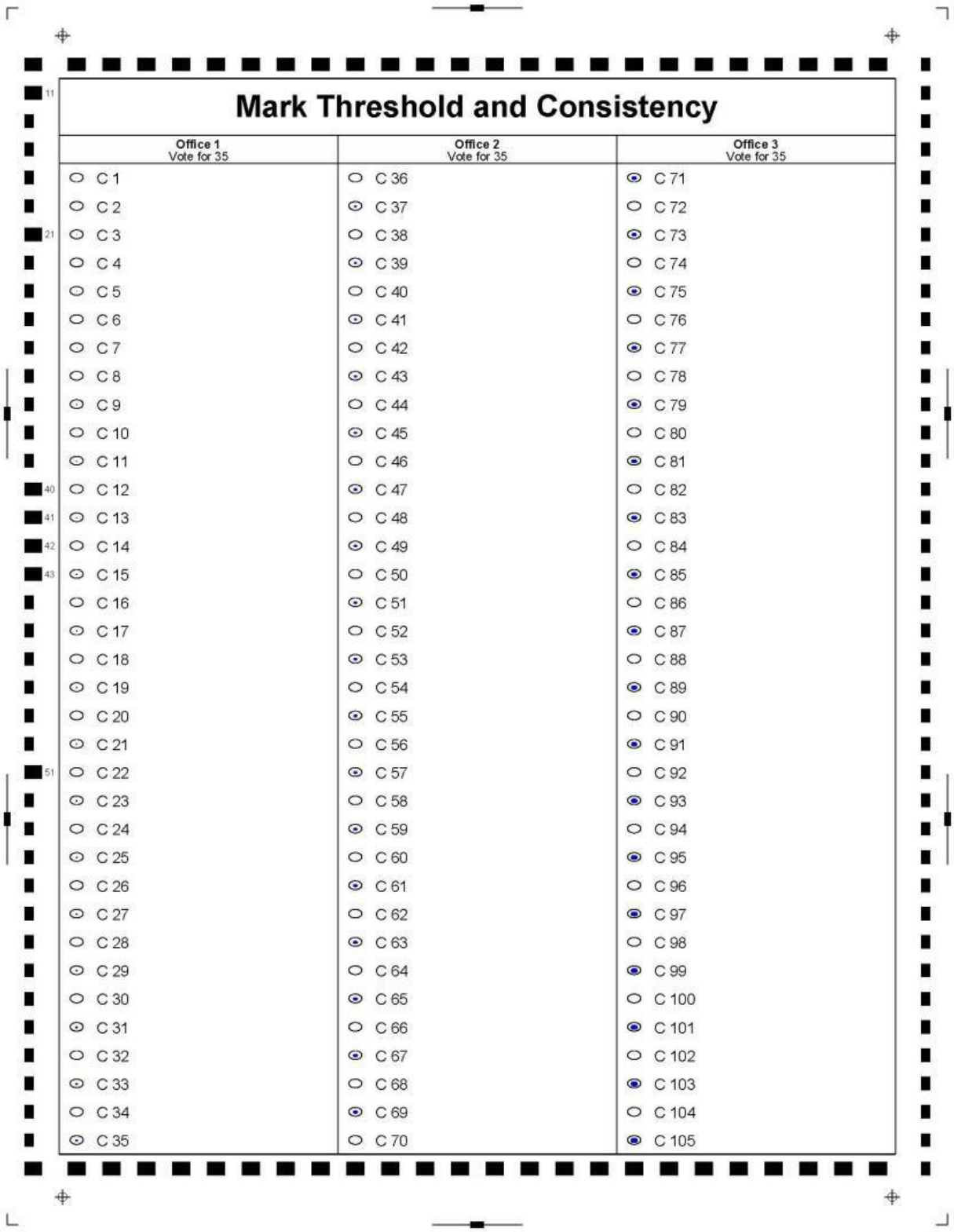


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-25. Computer Marked Ballot Sample – Med Blue 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

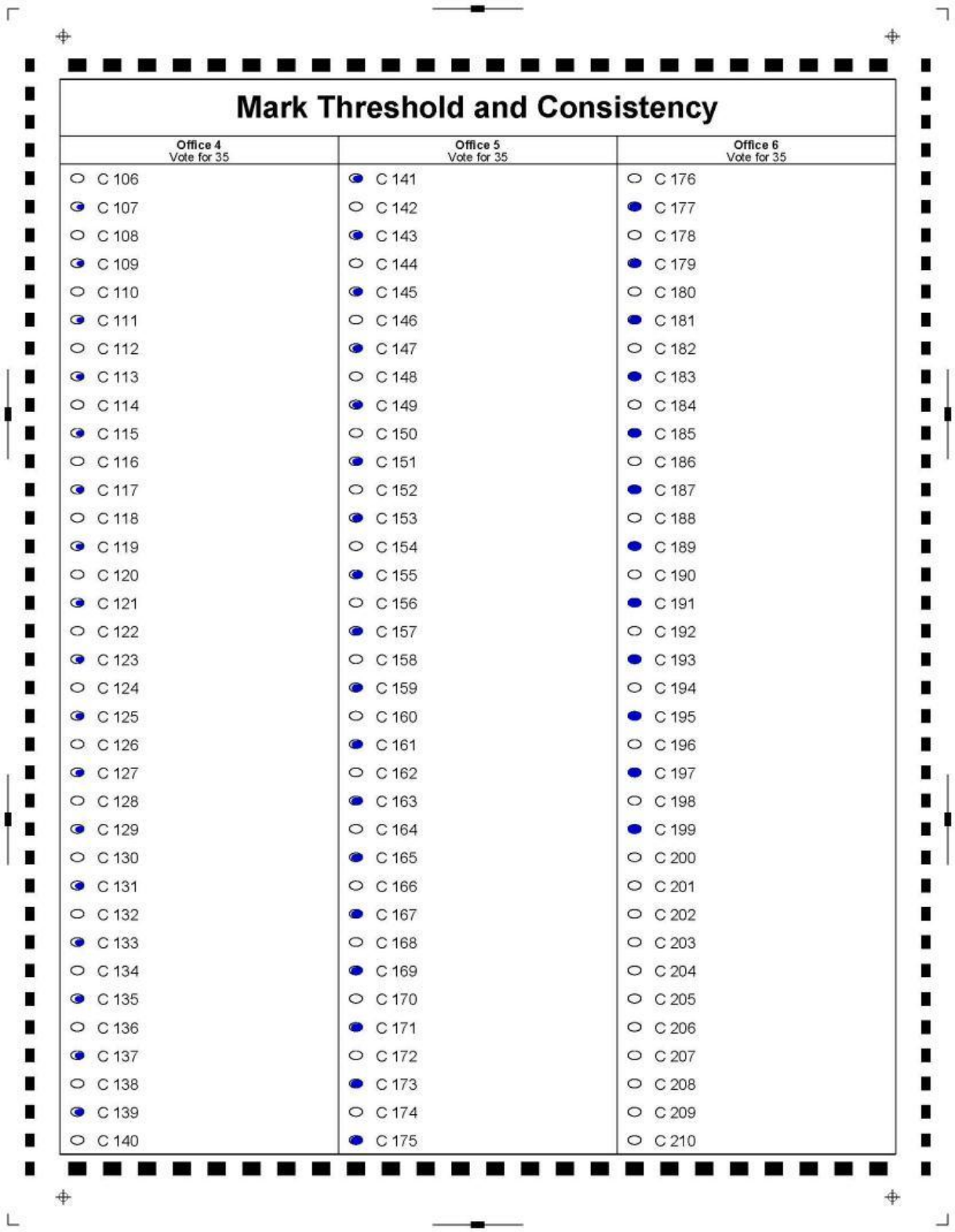


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-26. Computer Marked Ballot Sample – Med Blue 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

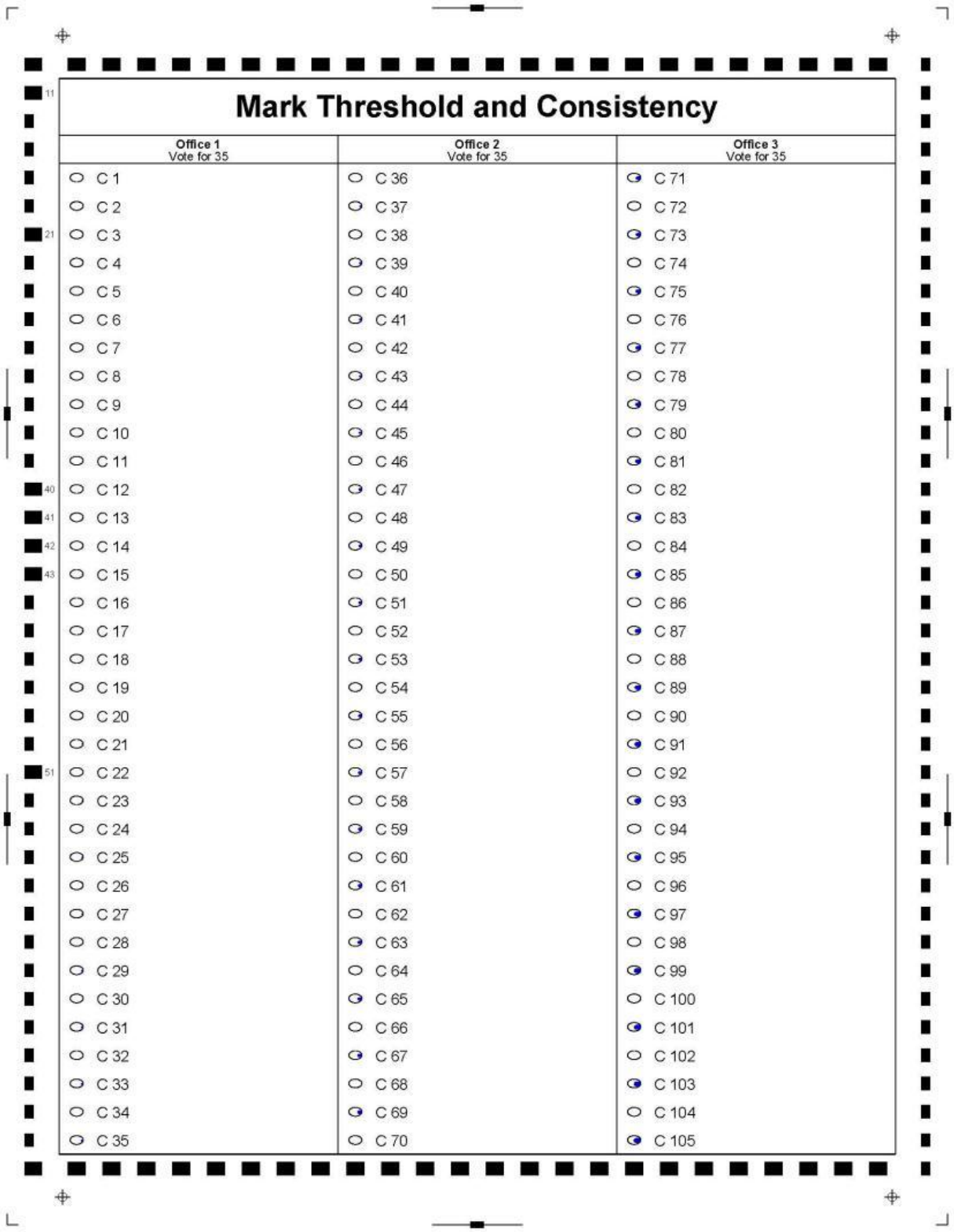


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-27. Computer Marked Ballot Sample – Med Blue 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

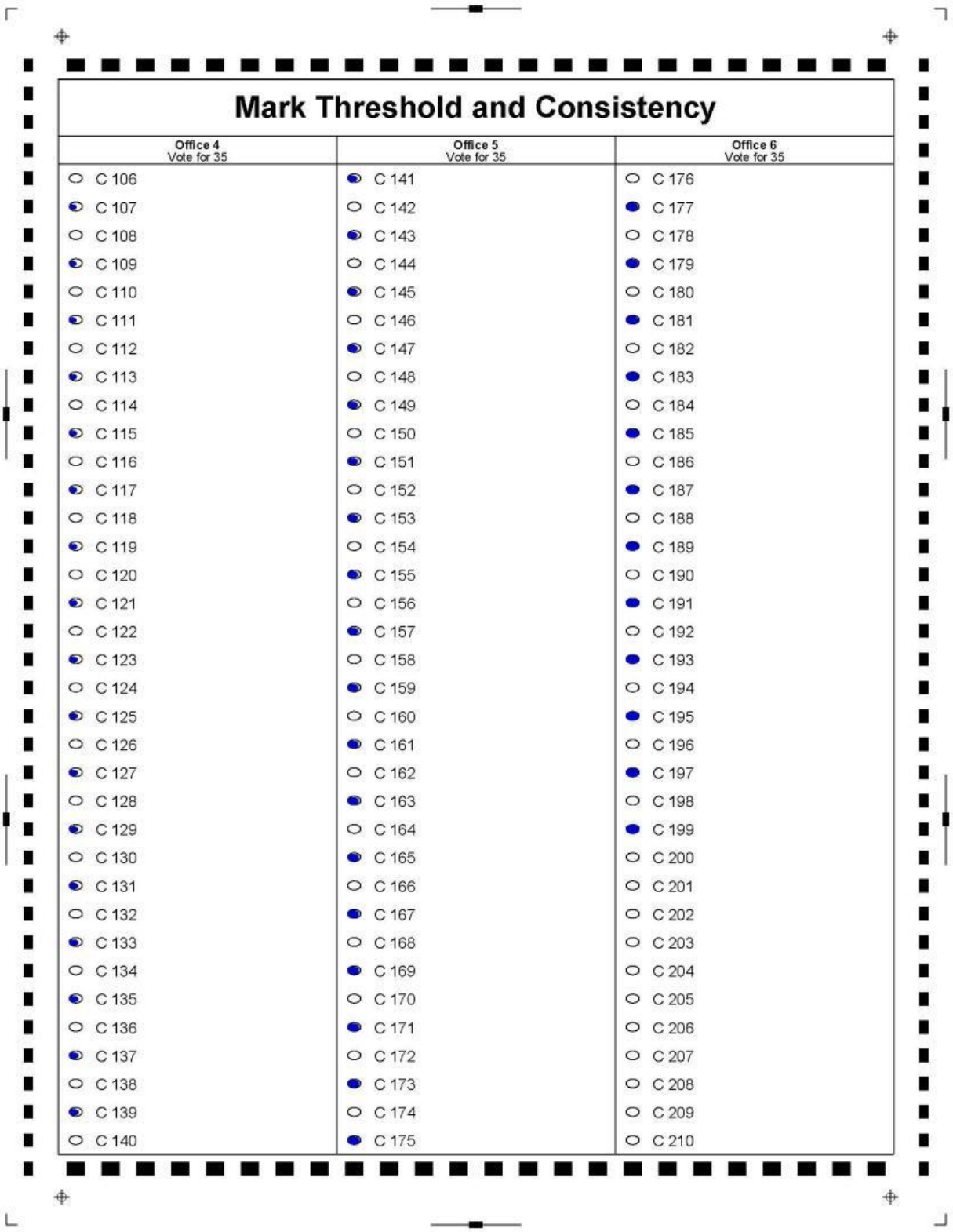


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-28. Computer Marked Ballot Sample – Med Blue 1% Incremented Fill from Right

E.1 Mark Consistency and Threshold Ballots (continued)

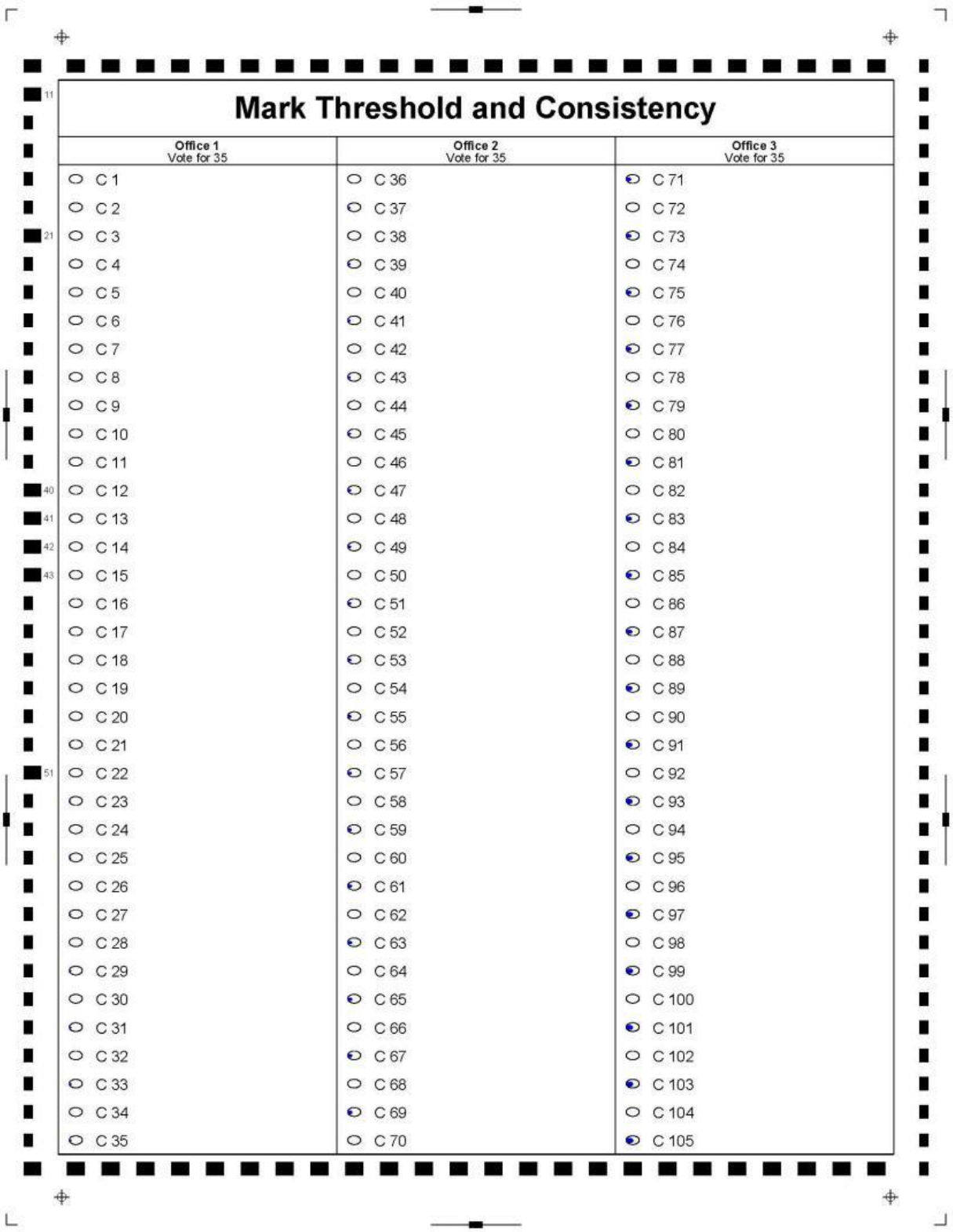


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-29. Computer Marked Ballot Sample – Med Blue 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

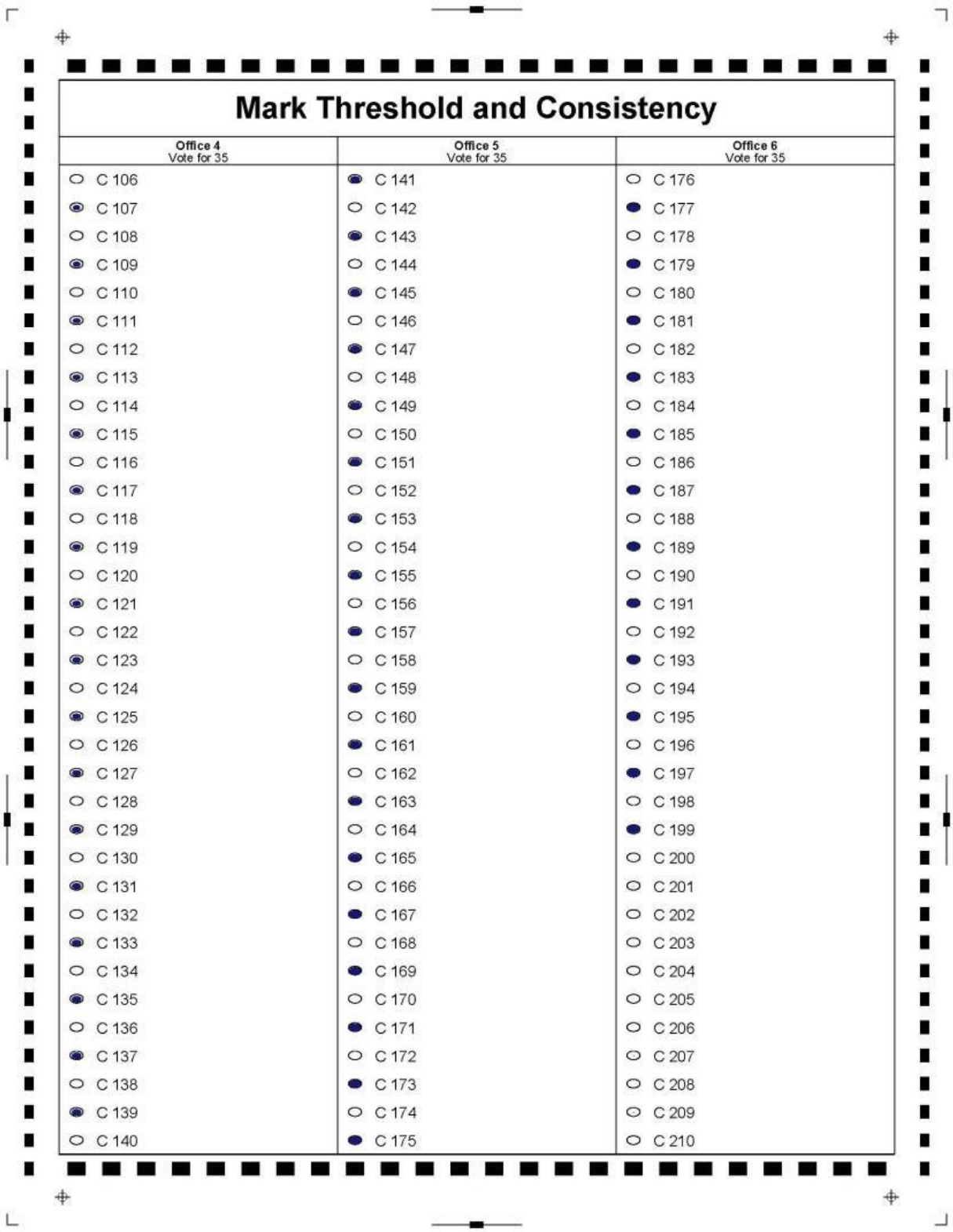


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-30. Computer Marked Ballot Sample – Med Blue 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

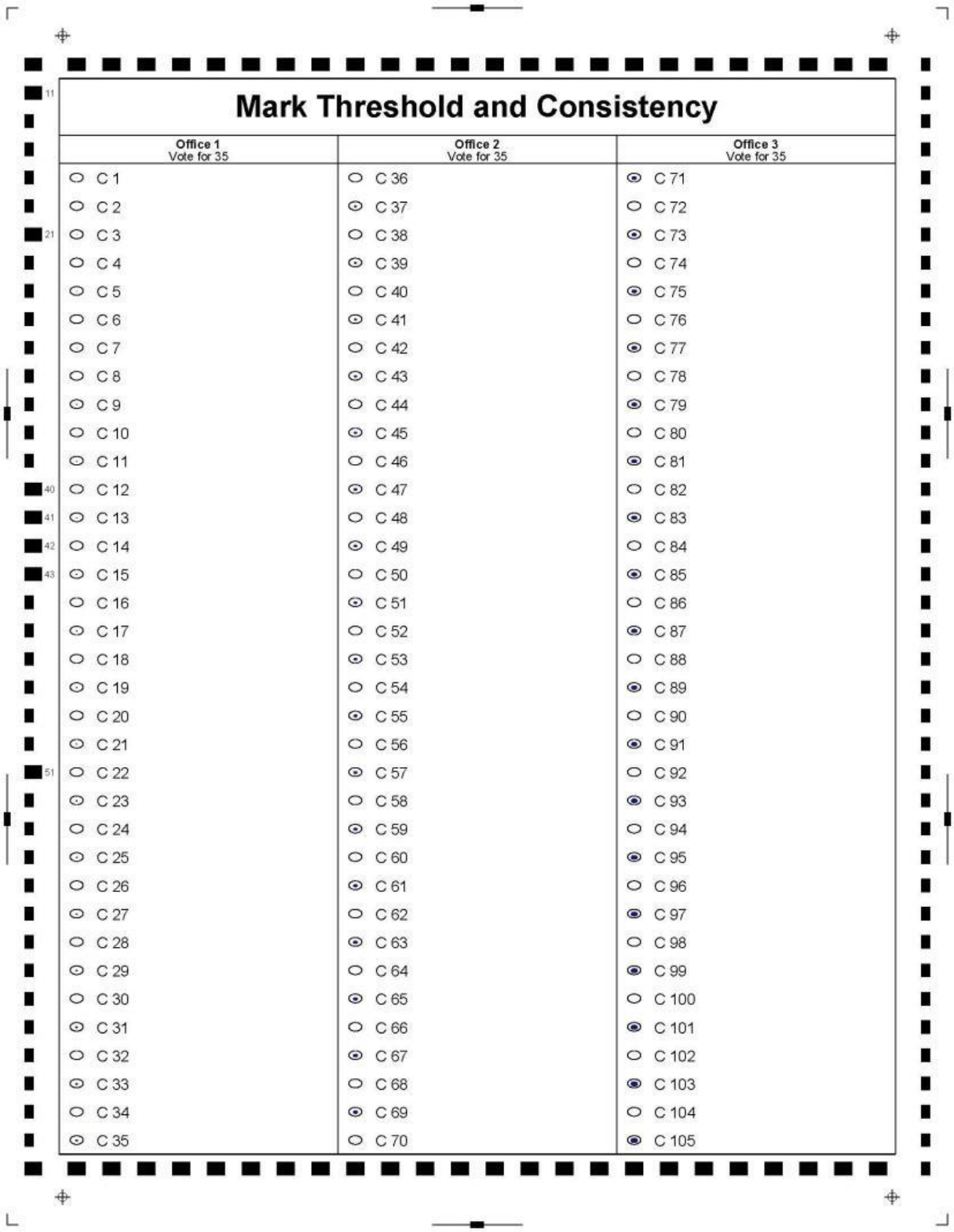


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-31. Computer Marked Ballot Sample – Midnight Blue 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

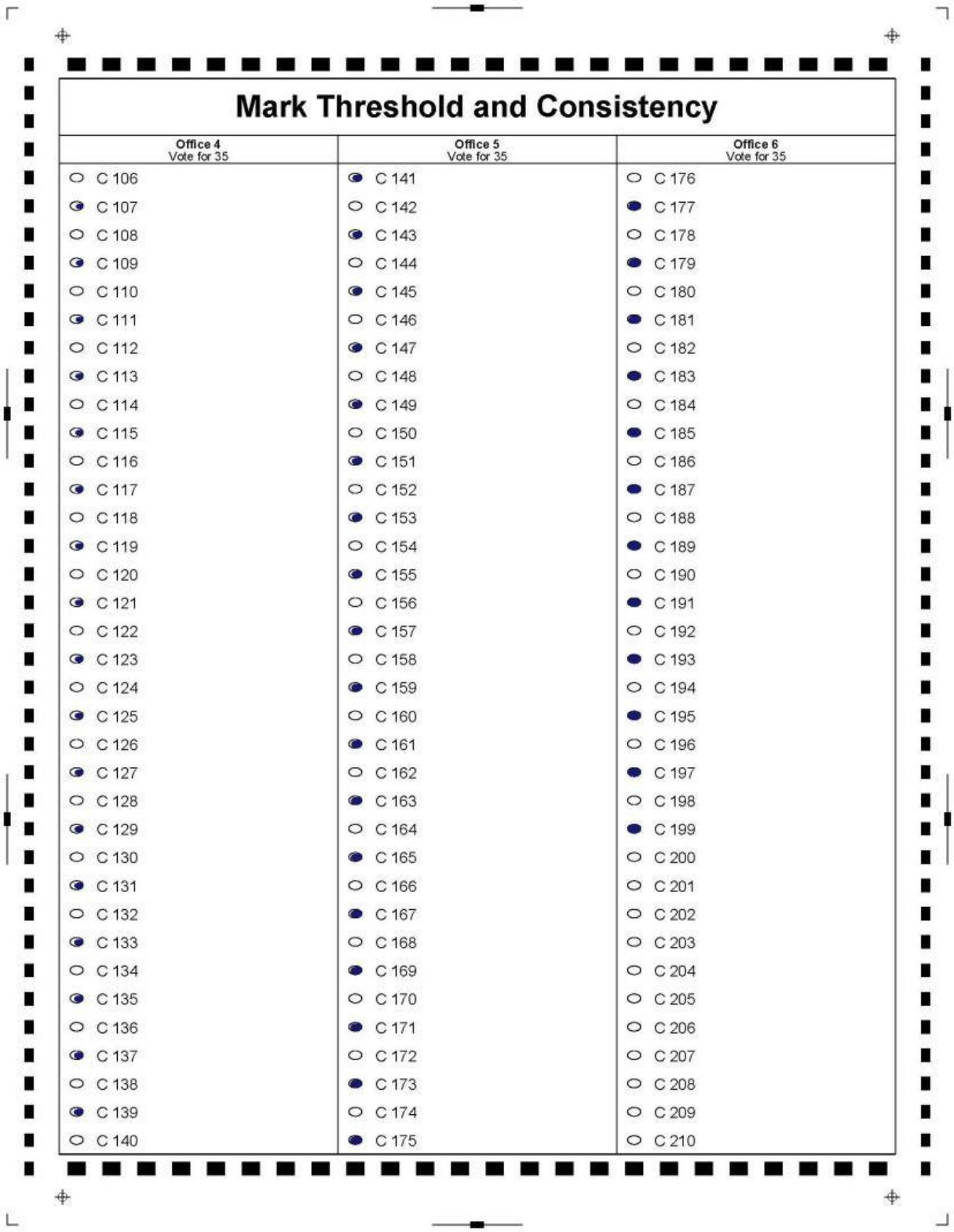


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-32. Computer Marked Ballot Sample – Midnight Blue 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

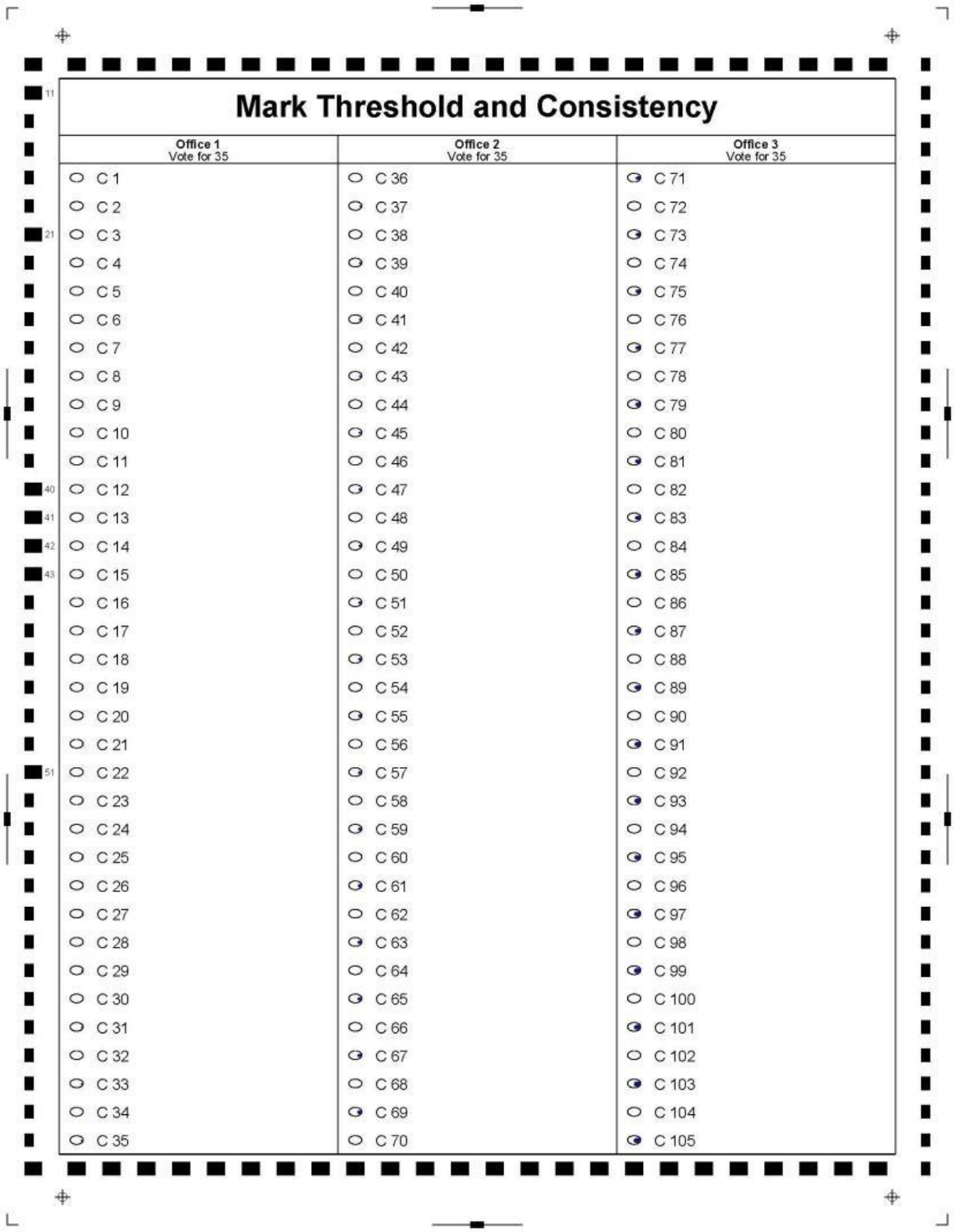


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-33. Computer Marked Ballot Sample – Midnight Blue 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

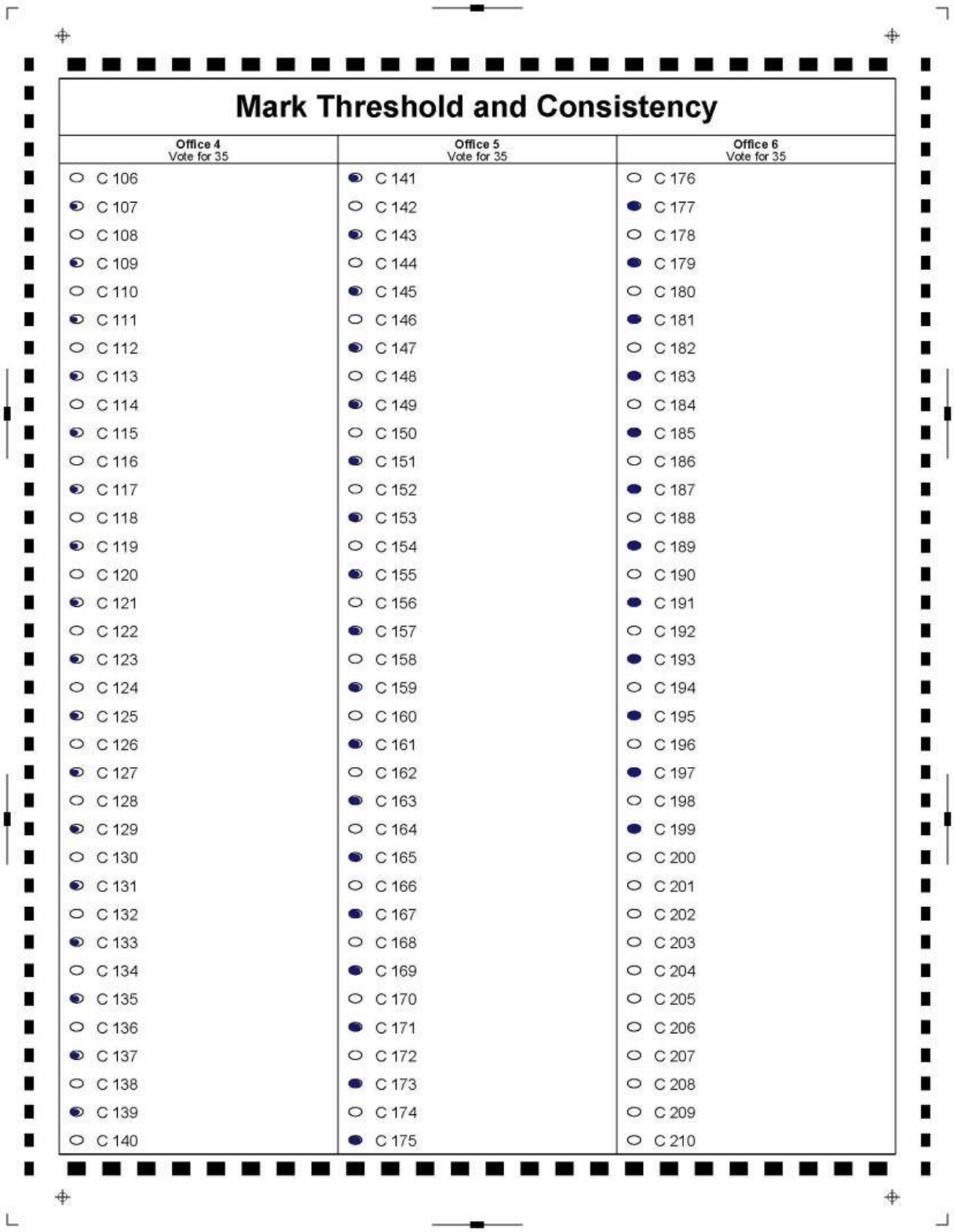


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-34. Computer Marked Ballot Sample – Midnight Blue 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

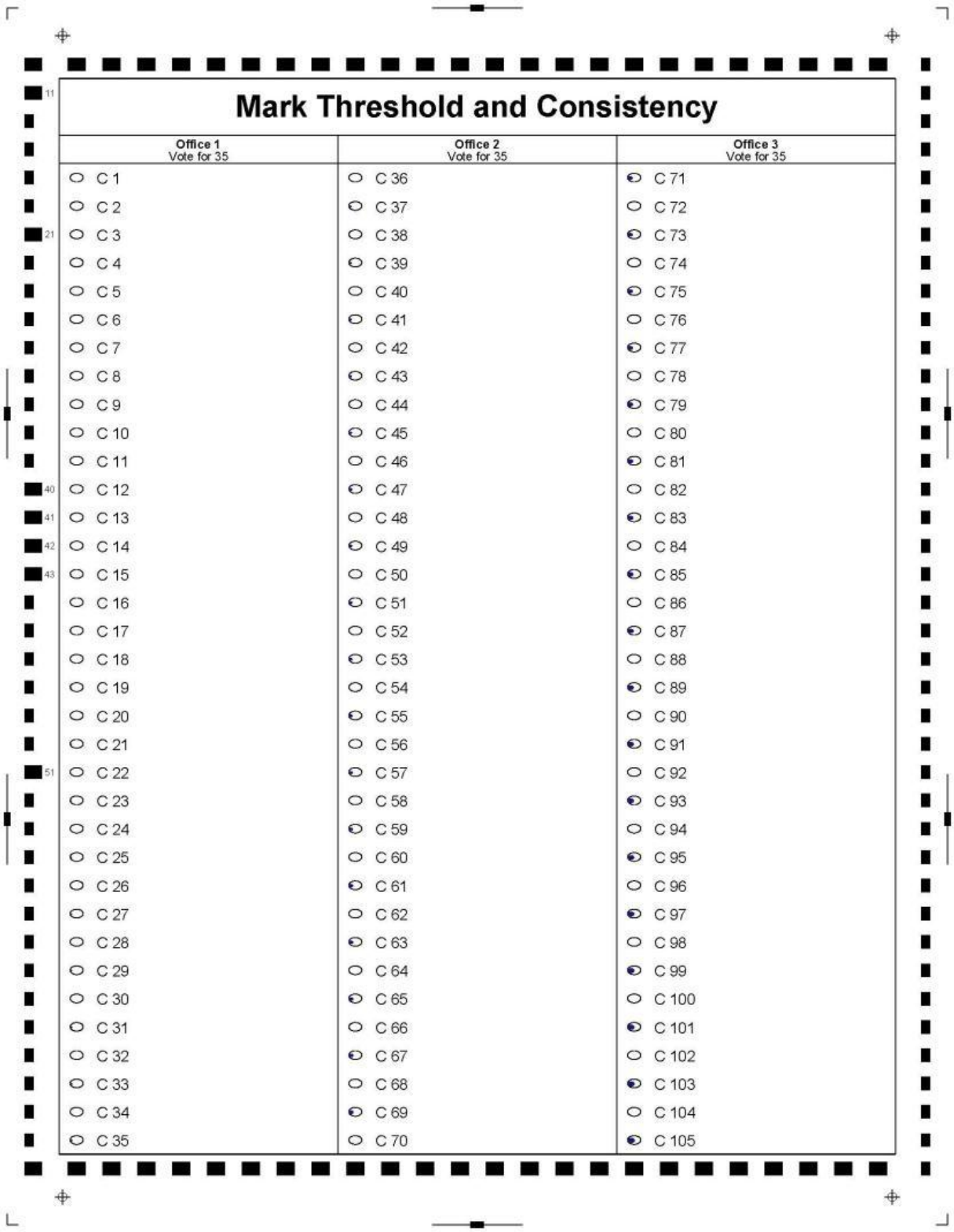


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-35. Computer Marked Ballot Sample – Midnight Blue 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

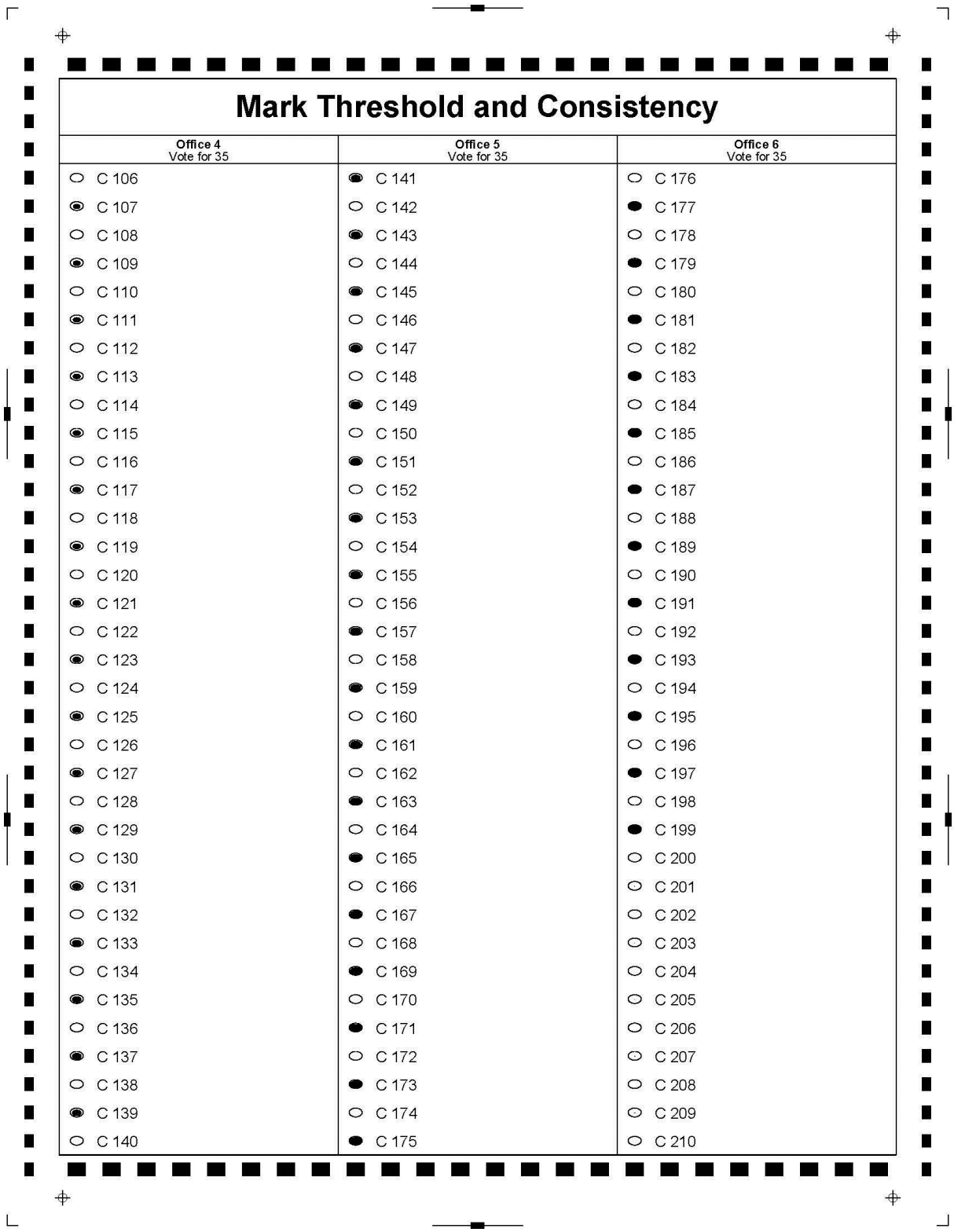


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-36. Computer Marked Ballot Sample – Midnight Blue 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

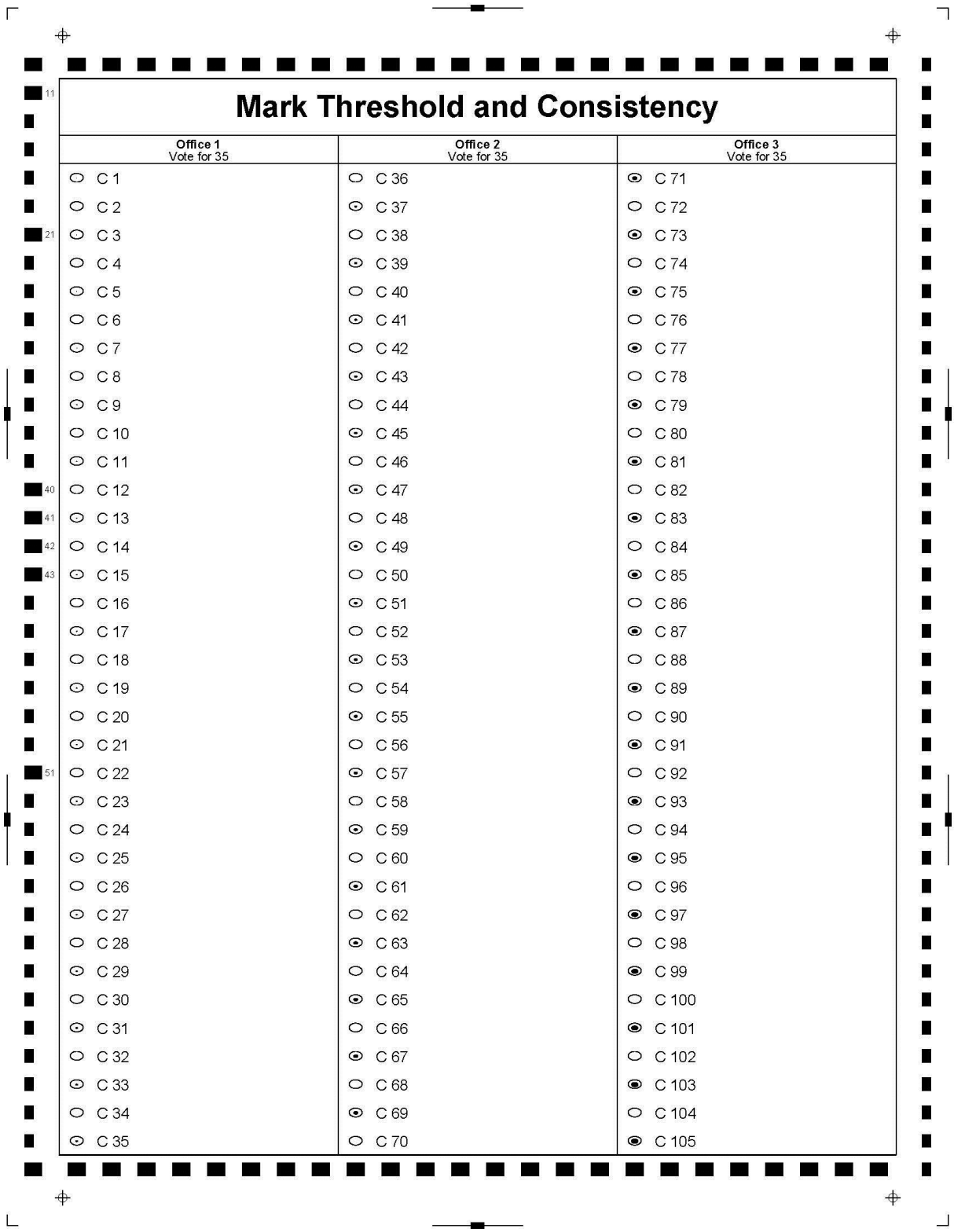


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-37. Computer Marked Ballot Sample – Black 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

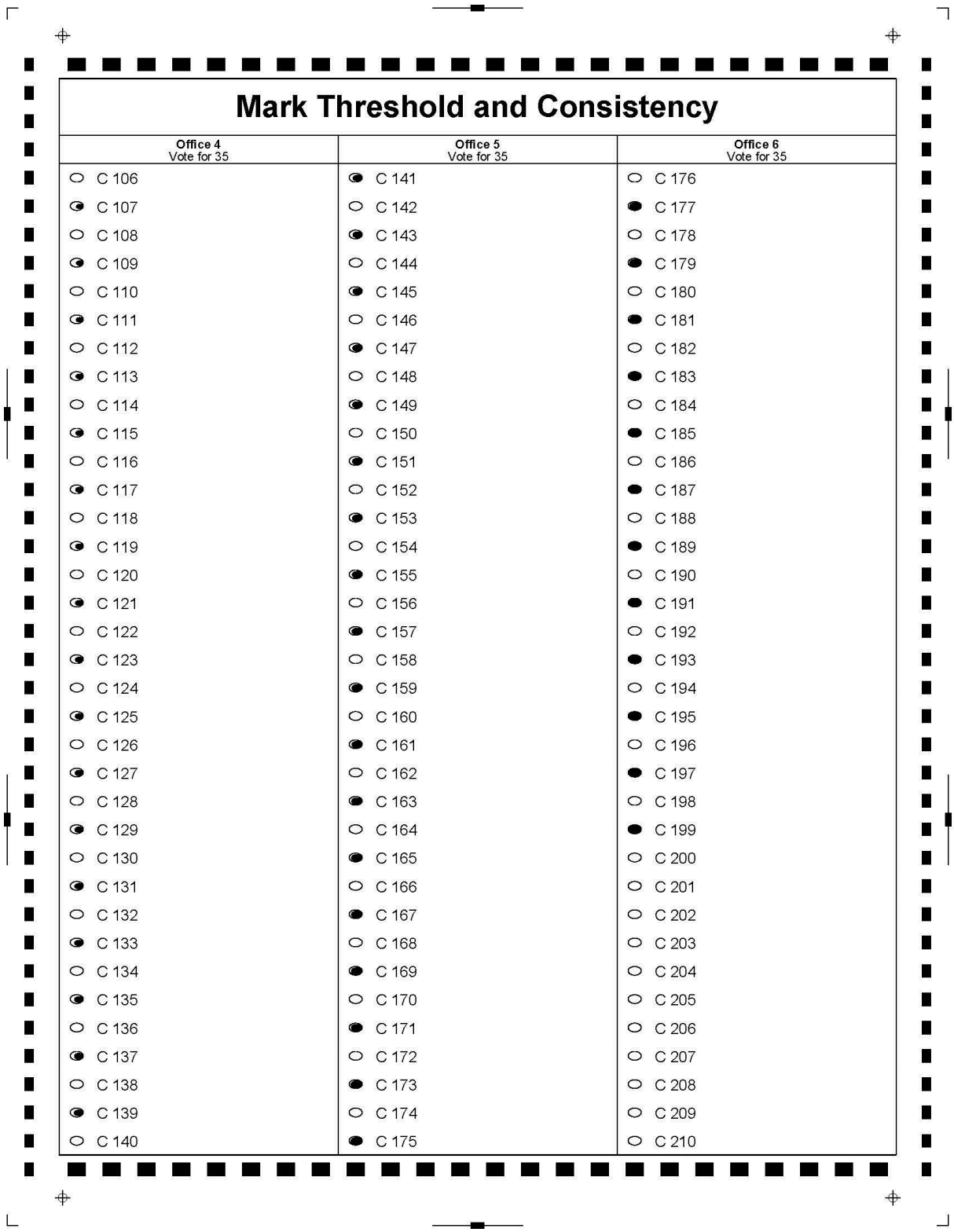


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-38. Computer Marked Ballot Sample – Black 1% Incremented Fill from Center

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

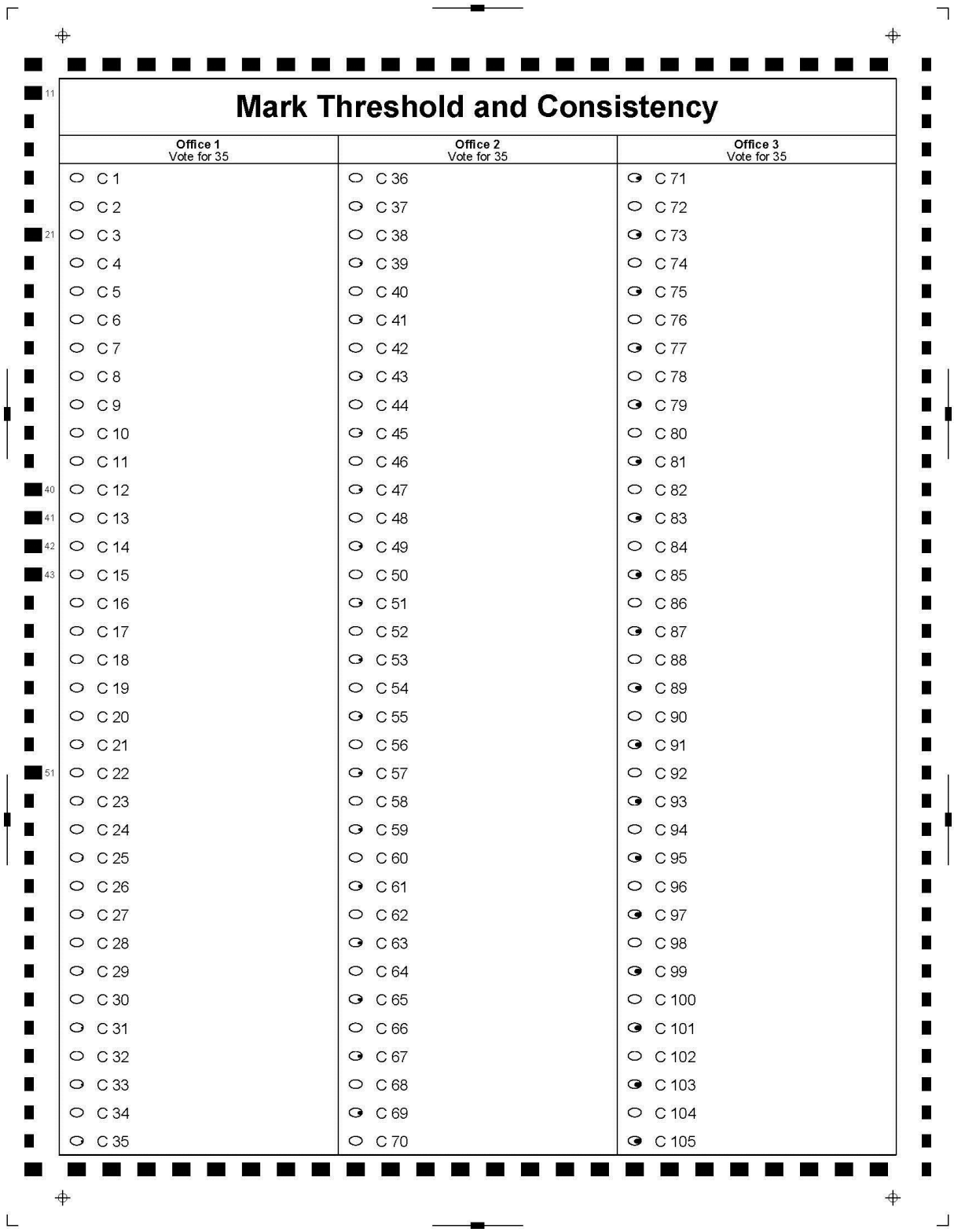


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-39. Computer Marked Ballot Sample – Black 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

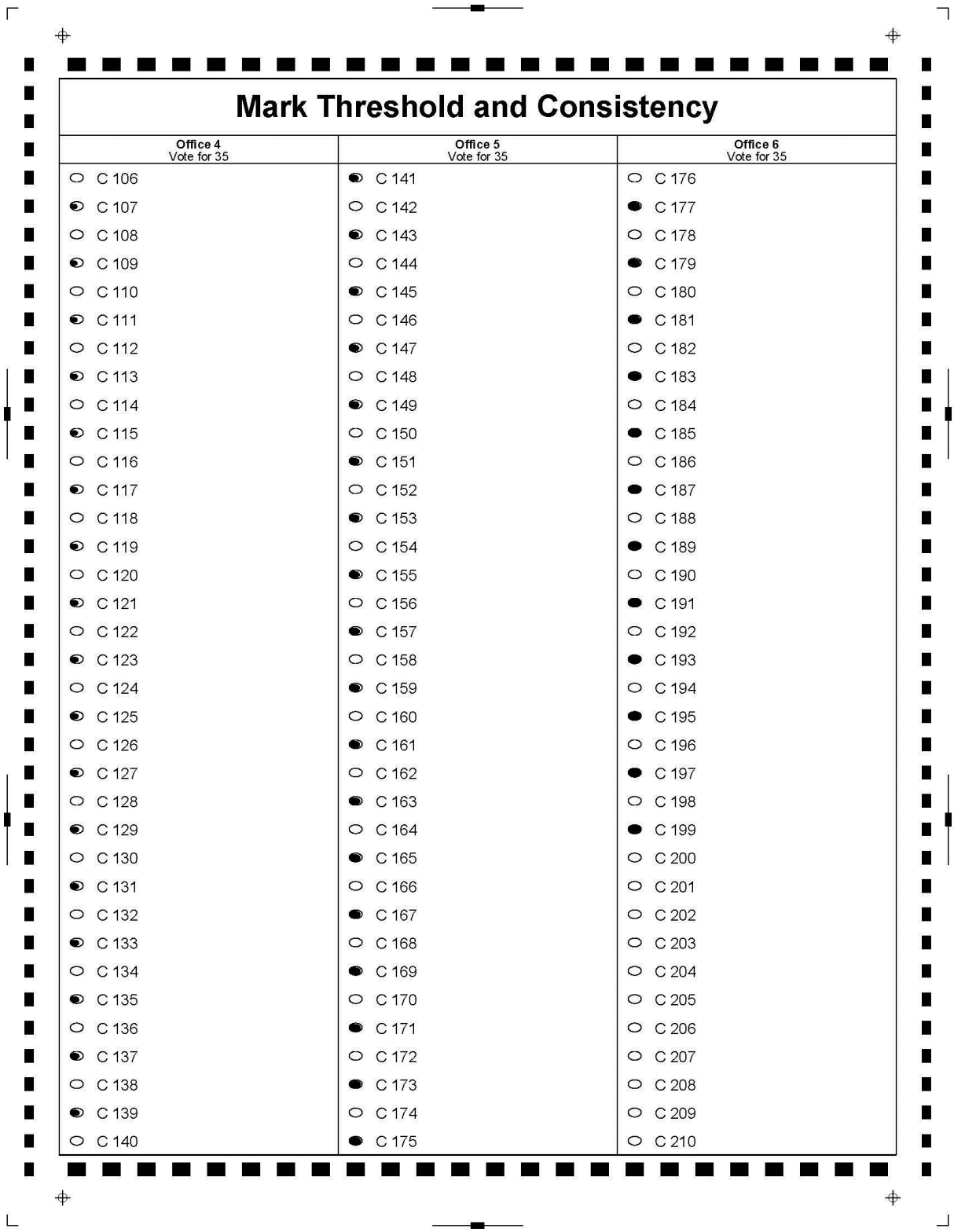


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-40. Computer Marked Ballot Sample – Black 1% Incremented Fill from Right

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

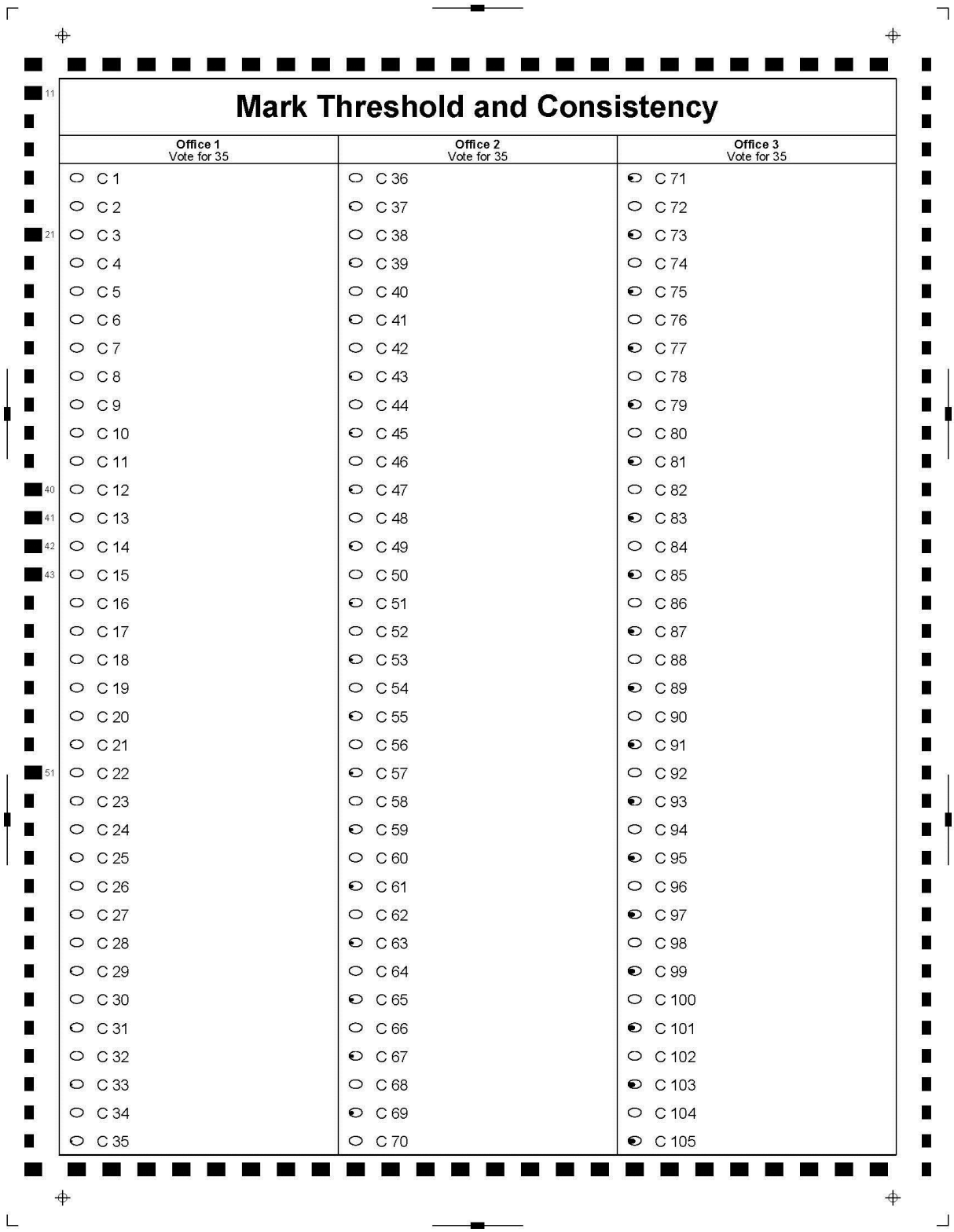


Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-41. Computer Marked Ballot Sample – Black 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)

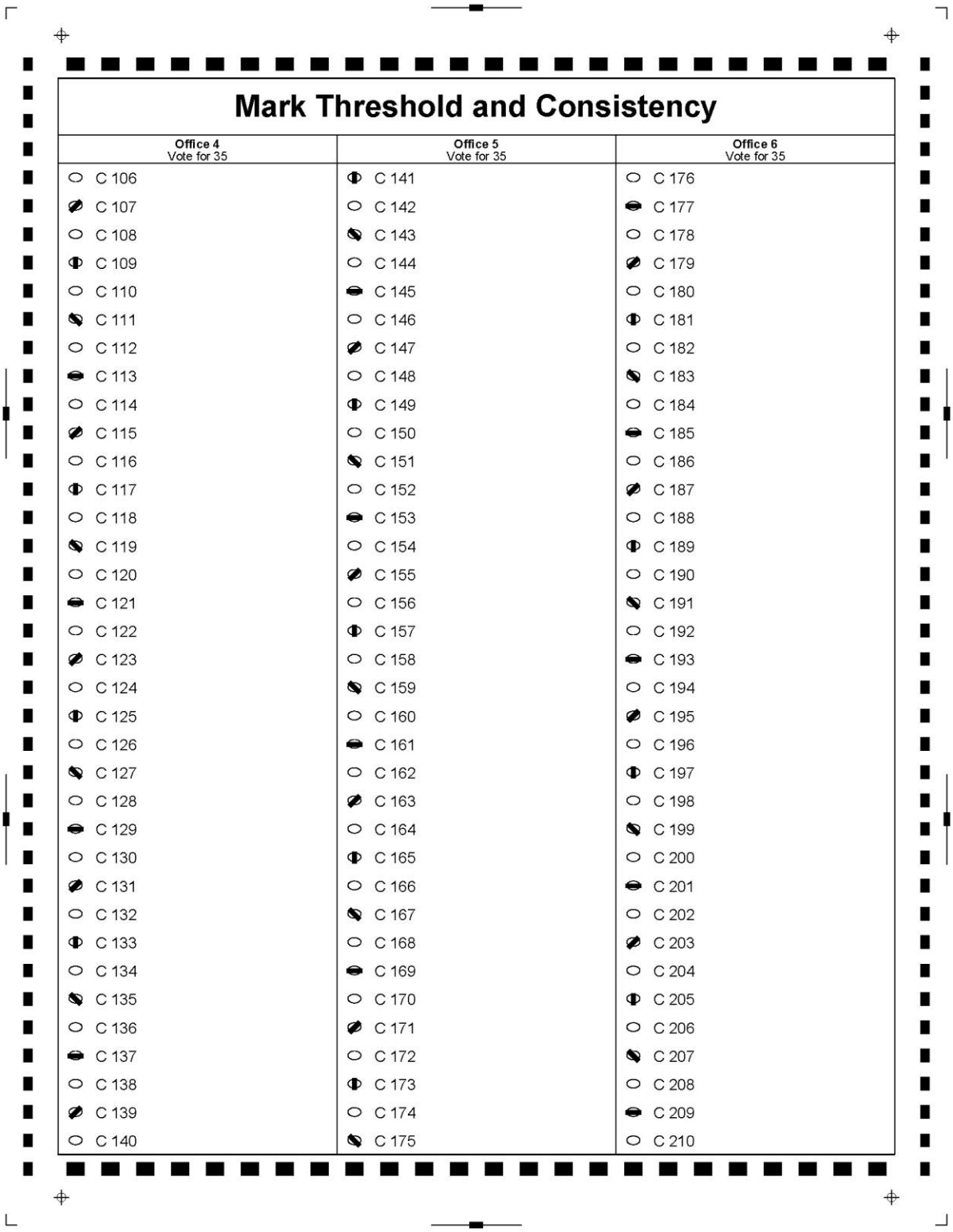


Mark Threshold and Consistency

Office 1 Vote for 35	Office 2 Vote for 35	Office 3 Vote for 35
C 1	C 36	C 71
C 2	C 37	C 72
C 3	C 38	C 73
C 4	C 39	C 74
C 5	C 40	C 75
C 6	C 41	C 76
C 7	C 42	C 77
C 8	C 43	C 78
C 9	C 44	C 79
C 10	C 45	C 80
C 11	C 46	C 81
C 12	C 47	C 82
C 13	C 48	C 83
C 14	C 49	C 84
C 15	C 50	C 85
C 16	C 51	C 86
C 17	C 52	C 87
C 18	C 53	C 88
C 19	C 54	C 89
C 20	C 55	C 90
C 21	C 56	C 91
C 22	C 57	C 92
C 23	C 58	C 93
C 24	C 59	C 94
C 25	C 60	C 95
C 26	C 61	C 96
C 27	C 62	C 97
C 28	C 63	C 98
C 29	C 64	C 99
C 30	C 65	C 100
C 31	C 66	C 101
C 32	C 67	C 102
C 33	C 68	C 103
C 34	C 69	C 104
C 35	C 70	C 105

Figure E-42. Computer Marked Ballot Sample – Black 1% Incremented Fill from Left

E.1 MARK CONSISTENCY AND THRESHOLD BALLOTS (CONTINUED)



Mark Threshold and Consistency

Office 4 Vote for 35	Office 5 Vote for 35	Office 6 Vote for 35
C 106	C 141	C 176
C 107	C 142	C 177
C 108	C 143	C 178
C 109	C 144	C 179
C 110	C 145	C 180
C 111	C 146	C 181
C 112	C 147	C 182
C 113	C 148	C 183
C 114	C 149	C 184
C 115	C 150	C 185
C 116	C 151	C 186
C 117	C 152	C 187
C 118	C 153	C 188
C 119	C 154	C 189
C 120	C 155	C 190
C 121	C 156	C 191
C 122	C 157	C 192
C 123	C 158	C 193
C 124	C 159	C 194
C 125	C 160	C 195
C 126	C 161	C 196
C 127	C 162	C 197
C 128	C 163	C 198
C 129	C 164	C 199
C 130	C 165	C 200
C 131	C 166	C 201
C 132	C 167	C 202
C 133	C 168	C 203
C 134	C 169	C 204
C 135	C 170	C 205
C 136	C 171	C 206
C 137	C 172	C 207
C 138	C 173	C 208
C 139	C 174	C 209
C 140	C 175	C 210

Figure E-43. Computer Marked Ballot Sample – Black 1 millimeter line rotating 45º marking method

APPENDIX F – DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST

Tables F.1 through 7.6 display data from ballots run for Mark Consistency and Threshold Test.

Table F.1. DS200 1% Fill Increase From Right

DS200 1% Fill Increase From Right						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.1. DS200 1% Fill Increase From Right (Continued)

DS200 1% Fill Increase From Right						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
29	0	1	0	0	0	0
30	0	1	0	0	0	0
31	0	1	0	0	1	0
32	0	3	0	0	0	0
33	0	13	0	0	2	0
34	0	1	0	0	0	0
35	7	51	14	1	24	0
36	11	67	5	22	28	0
37	32	79	31	27	55	0
38	46	82	54	41	73	0
39	60	86	62	58	87	0
40	70	87	71	75	91	0
41	69	93	89	79	94	0
42	85	96	94	88	96	0
43	88	97	94	90	96	0
44	88	97	100	95	99	1
45	90	98	99	99	100	1
46	90	98	100	97	100	0
47	95	98	100	99	100	0
48	97	98	100	99	100	1
49	97	100	100	100	100	0
50	98	100	100	99	100	0
51	99	100	100	99	100	0
52	98	100	100	98	100	0
53	100	100	100	100	100	38
54	100	100	100	100	100	25
55	100	100	100	100	100	26
56	100	100	100	100	100	38
57	100	100	100	100	100	45
58	100	100	100	100	100	50
59	100	100	100	100	100	45
60	100	100	100	100	100	28
61	100	100	100	100	100	36
62	100	100	100	100	100	51
63	100	100	100	100	100	48
64	100	100	100	100	100	32

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.1. DS200 1% Fill Increase From Right (Continued)

DS200 1% Fill Increase From Right						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
65	100	100	100	100	100	32
66	100	100	100	100	100	49
67	100	100	100	100	100	43
68	100	100	100	100	100	44
69	100	100	100	100	100	49
70	100	100	100	100	100	1
71	100	100	100	100	100	0
72	100	100	100	100	100	0
73	100	100	100	100	100	2
74	100	100	100	100	100	2
75	100	100	100	100	100	5
76	100	100	100	100	100	25
77	100	100	100	100	100	29
78	100	100	100	100	100	14
79	100	100	100	100	100	1
80	100	100	100	100	100	0
81	100	100	100	100	100	0
82	100	100	100	100	100	0
83	100	100	100	100	100	0
84	100	100	100	100	100	0
85	100	100	100	100	100	0
86	100	100	100	100	100	11
87	100	100	100	100	100	11
88	100	100	100	100	100	14
90	100	100	100	100	100	22
91	100	100	100	100	100	30
92	100	100	100	100	100	49
93	100	100	100	100	100	67
94	100	100	100	100	100	67
95	100	100	100	100	100	85
96	100	100	100	100	100	68
97	100	100	100	100	100	54
98	100	100	100	100	100	28
99	100	100	100	100	100	14
100	100	100	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.2. DS200 1% Fill Increase From Center

DS200 1% Fill Increase From Center						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	5	2	2	0	0
28	0	4	5	3	0	0
29	0	17	14	9	5	0
30	0	25	35	17	17	0
31	7	63	72	47	42	0
32	2	67	71	50	56	0
33	54	98	99	97	79	0
34	56	95	96	86	83	0
35	54	98	96	86	88	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.2. DS200 1% Fill Increase From Center (Continued)

DS200 1% Fill Increase From Center						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
36	70	100	100	93	90	0
37	95	99	100	93	85	0
38	98	100	99	88	75	0
39	100	99	99	83	69	0
40	99	98	99	85	74	0
41	100	100	99	94	77	0
42	98	92	94	84	80	0
43	99	99	97	88	78	0
44	99	100	99	89	82	0
45	100	100	99	90	93	1
46	100	97	100	93	94	4
47	100	100	100	96	97	2
48	100	100	100	99	99	0
49	100	100	100	99	100	0
50	100	100	100	99	100	0
51	100	100	100	99	99	0
52	100	100	100	100	100	0
53	100	100	100	100	100	21
54	100	100	100	100	100	30
55	100	100	100	100	100	25
56	100	100	100	100	100	25
57	100	100	100	100	100	31
58	100	100	100	100	100	41
59	100	100	100	100	100	35
60	100	100	100	100	100	30
61	100	100	100	100	100	38
62	100	100	100	100	100	54
63	100	100	100	100	100	48
64	100	100	100	100	100	38
65	100	100	100	100	100	41
66	100	100	100	100	100	46
67	100	100	100	100	100	46
68	100	100	100	100	100	48
69	100	100	100	100	100	48
70	100	100	100	100	100	0
71	100	100	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.2. DS200 1% Fill Increase From Center (Continued)

DS200 1% Fill Increase From Center						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
72	100	100	100	100	100	0
73	100	100	100	100	100	0
74	100	100	100	100	100	3
75	100	100	100	100	100	15
76	100	100	100	100	100	37
77	100	100	100	100	100	32
78	100	100	100	100	100	25
79	100	100	100	100	100	3
80	100	100	100	100	100	3
81	100	100	100	100	100	12
82	100	100	100	100	100	7
83	100	100	100	100	100	5
84	100	100	100	100	100	4
85	100	100	100	100	100	5
86	100	100	100	100	100	27
87	100	100	100	100	100	19
88	100	100	100	100	100	8
89	100	100	100	100	100	3
90	100	100	100	100	100	1
91	100	100	100	100	100	1
92	100	100	100	100	100	4
93	100	100	100	100	100	16
94	100	100	100	100	100	55
95	100	100	100	100	100	69
96	100	100	100	100	100	49
97	100	100	100	100	100	27
98	100	100	100	100	100	18
99	100	100	100	100	100	28
100	100	100	100	100	100	17

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.3. DS200 1% Fill Increase From Left

DS200 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.3. DS200 1% Fill Increase From Left (Continued)

DS200 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
31	1	9	9	5	0	0
32	15	8	22	30	0	0
33	9	17	34	26	8	0
34	26	23	47	56	9	0
35	64	38	46	85	15	0
36	74	57	52	91	27	0
37	90	65	55	93	30	0
38	99	64	68	96	44	0
39	97	68	64	100	54	0
40	100	71	79	99	59	0
41	97	77	82	100	72	0
42	99	81	77	100	76	0
43	100	81	94	100	79	0
44	100	85	98	100	87	0
45	100	81	98	100	80	0
46	100	91	97	100	98	0
47	100	96	99	100	97	0
48	100	99	99	100	100	0
49	100	100	98	100	100	0
50	99	100	100	100	100	0
51	100	99	99	100	100	0
52	100	100	99	100	100	0
53	100	98	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.3. DS200 1% Fill Increase From Left

DS200 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
54	100	100	100	100	100	16
55	100	100	100	100	100	14
56	100	100	100	100	100	14
57	100	100	100	100	100	19
58	100	100	100	100	100	17
59	100	100	100	100	100	24
60	100	100	100	100	100	21
61	100	100	100	100	100	24
62	100	100	100	100	100	17
63	100	100	100	100	100	21
64	100	100	100	100	100	20
65	100	100	100	100	100	18
66	100	100	100	100	100	17
67	100	100	100	100	100	40
68	100	100	100	100	100	23
69	100	100	100	100	100	21
70	100	100	100	100	100	15
71	100	100	100	100	100	31
72	100	100	100	100	100	30
73	100	100	100	100	100	36
74	100	100	100	100	100	33
75	100	100	100	100	100	35
76	100	100	100	100	100	48
77	100	100	100	100	100	56
78	100	100	100	100	100	60
79	100	100	100	100	100	41
80	100	100	100	100	100	51
81	100	100	100	100	100	61
82	100	100	100	100	100	64
83	100	100	100	100	100	53
84	100	100	100	100	100	53
85	100	100	100	100	100	59
86	100	100	100	100	100	66
87	100	100	100	100	100	68
88	100	100	100	100	100	67
89	100	100	100	100	100	82

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.3. DS 200 1% Fill Increase From Left (Continued)

DS200 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
90	100	100	100	100	100	84
91	100	100	100	100	100	79
92	100	100	100	100	100	81
93	100	100	100	100	100	85
94	100	100	100	100	100	86
95	100	100	100	100	100	87
96	100	100	100	100	100	82
97	100	100	100	100	100	83
98	100	100	100	100	100	93
99	100	100	100	100	100	89
100	100	100	100	100	100	83

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.4. DS850 1% Fill Increase From Right

DS850 1% Fill Increase From Right						
	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
32	0	0	0	0	0	0
33	0	0	0	0	0	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.4. DS850 1% Fill Increase From Right (Continued)

DS850 1% Fill Increase From Right						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
34	0	0	0	0	0	0
35	1	0	0	0	6	0
36	0	0	0	0	31	0
37	2	0	2	0	41	0
38	16	13	27	13	75	0
39	35	27	47	25	87	0
40	53	32	61	50	96	0
41	71	68	85	74	100	0
42	98	92	98	91	100	0
43	99	99	100	99	100	0
44	100	100	100	100	100	0
45	100	100	100	100	100	0
46	100	100	100	100	100	0
47	100	100	100	100	100	0
48	100	100	100	100	100	0
49	100	100	100	100	100	0
50	100	100	100	100	100	0
51	100	100	100	100	100	0
52	100	100	100	100	100	0
53	100	100	100	100	100	0
54	100	100	100	100	100	0
55	100	100	100	100	100	1
56	100	100	100	100	100	0
57	100	100	100	100	100	0
58	100	100	100	100	100	0
59	100	100	100	100	100	3
60	100	100	100	100	100	0
61	100	100	100	100	100	0
62	100	100	100	100	100	0
63	100	100	100	100	100	0
64	100	100	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.4. DS850 1% Fill Increase From Right (Continued)

DS850 1% Fill Increase From Right						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
65	100	100	100	100	100	0
66	100	100	100	100	100	0
67	100	100	100	100	100	0
68	100	100	100	100	100	0
69	100	100	100	100	100	0
70	100	100	100	100	100	0
71	100	100	100	100	100	0
72	100	100	100	100	100	1
73	100	100	100	100	100	0
74	100	100	100	100	100	0
75	100	100	100	100	100	1
76	100	100	100	100	100	0
77	100	100	100	100	100	1
78	100	100	100	100	100	0
79	100	100	100	100	100	0
80	100	100	100	100	100	1
81	100	100	100	100	100	1
82	100	100	100	100	100	0
83	100	100	100	100	100	0
84	100	100	100	100	100	1
85	100	100	100	100	100	3
86	100	100	100	100	100	2
87	100	100	100	100	100	0
88	100	100	100	100	100	0
89	100	100	100	100	100	4
90	100	100	100	100	100	8
91	100	100	100	100	100	11
92	100	100	100	100	100	7
93	100	100	100	100	100	11
94	100	100	100	100	100	27
95	100	100	100	100	100	17
96	100	100	100	100	100	16
97	100	100	100	100	100	27
98	100	100	100	100	100	43
99	100	100	100	100	100	44
100	100	100	100	100	100	4

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.5. DS850 1% Fill Increase From Center

DS850 1% Fill Increase From Center						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	2	0	0
28	0	1	1	3	1	0
29	5	6	11	9	8	0
30	12	24	37	17	22	0
31	42	53	66	47	39	0
32	50	47	86	50	48	0
33	90	86	84	95	91	2
34	96	94	100	86	98	0
35	100	100	100	86	100	0
36	100	100	100	93	100	0

SIGNATURES

Prepared by: for Jon Weathers Date: 7/1/2015
Jon Weathers, Project Manager

Approved by: Lisa Towers for Date: 7/1/15
James Long, Program Manager

Approved by: Date: 7/1/15
Robert Hardy, Department Manager

Reviewed by: Date: 7/1/15
Rick Davis, QA Manager

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.5. DS850 1% Fill Increase From Center

DS850 1% fill increase from Center						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
37	100	100	100	93	100	0
38	100	100	100	88	100	0
39	100	100	100	83	100	0
40	100	100	100	85	100	0
41	100	100	100	94	100	0
42	100	100	100	84	100	0
43	100	100	100	88	100	0
44	100	100	100	89	100	0
45	100	100	100	90	100	0
46	100	100	100	93	100	0
47	100	100	100	96	100	0
48	100	100	100	99	100	0
49	100	100	100	99	100	0
50	100	100	100	99	100	0
51	100	100	100	99	100	0
52	100	100	100	100	100	0
53	100	100	100	100	100	0
54	100	100	100	100	100	0
55	100	100	100	100	100	0
56	100	100	100	100	100	0
57	100	100	100	100	100	0
58	100	100	100	100	100	0
59	100	100	100	100	100	0
60	100	100	100	100	100	0
61	100	100	100	100	100	0
62	100	100	100	100	100	0
63	100	100	100	100	100	0
64	100	100	100	100	100	0
65	100	100	100	100	100	0
66	100	100	100	100	100	0
67	100	100	100	100	100	0
68	100	100	100	100	100	0
69	100	100	100	100	100	0
70	100	100	100	100	100	0
71	100	100	100	100	100	0
72	100	100	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.5. DS850 1% Fill Increase From Center

DS850 1% fill increase from Center						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
73	100	100	100	100	100	0
74	100	100	100	100	100	0
75	100	100	100	100	100	1
76	100	100	100	100	100	0
77	100	100	100	100	100	1
78	100	100	100	100	100	1
79	100	100	100	100	100	0
80	100	100	100	100	100	1
81	100	100	100	100	100	2
82	100	100	100	100	100	1
83	100	100	100	100	100	0
84	100	100	100	100	100	1
85	100	100	100	100	100	1
86	100	100	100	100	100	0
87	100	100	100	100	100	0
88	100	100	100	100	100	0
89	100	100	100	100	100	2
90	100	100	100	100	100	0
91	100	100	100	100	100	1
92	100	100	100	100	100	0
93	100	100	100	100	100	2
94	100	100	100	100	100	1
95	100	100	100	100	100	2
96	100	100	100	100	100	2
97	100	100	100	100	100	8
98	100	100	100	100	100	5
99	100	100	100	100	100	1
100	100	100	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.6. DS850 1% Fill Increase From Left

DS850 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0
31	1	0	7	0	0	0
32	14	13	30	13	1	0
33	14	14	23	27	7	0
34	48	45	52	46	19	0
35	76	77	96	91	30	0
36	83	87	94	97	41	0
37	98	97	100	100	65	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.6. DS850 1% Fill Increase From Left (Continued)

DS850 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
38	100	100	100	100	85	0
39	100	100	100	100	98	0
40	100	100	100	100	97	0
41	100	100	100	100	100	0
42	100	100	100	100	100	0
43	100	100	100	100	100	0
44	100	100	100	100	100	0
45	100	100	100	100	100	0
46	100	100	100	100	100	0
47	100	100	100	100	100	0
48	100	100	100	100	100	0
49	100	100	100	100	100	0
50	100	100	100	100	100	0
51	100	100	100	100	100	0
52	100	100	100	100	100	0
53	100	100	100	100	100	0
54	100	100	100	100	100	0
55	100	100	100	100	100	0
56	100	100	100	100	100	0
57	100	100	100	100	100	0
58	100	100	100	100	100	0
59	100	100	100	100	100	0
60	100	100	100	100	100	0
61	100	100	100	100	100	0
62	100	100	100	100	100	0
63	100	100	100	100	100	0
64	100	100	100	100	100	0
65	100	100	100	100	100	0
66	100	100	100	100	100	0
67	100	100	100	100	100	0
68	100	100	100	100	100	0
69	100	100	100	100	100	0
70	100	100	100	100	100	0
71	100	100	100	100	100	0
72	100	100	100	100	100	0
73	100	100	100	100	100	0
74	100	100	100	100	100	0

F.1 - DATA TABLES: MARKS CONSISTENCY AND THRESHOLD TEST (CONTINUED)

Table F.6. DS850 1% Fill Increase From Left (Continued)

DS850 1% Fill Increase From Left						
%	Green	Red	Midnight Blue	Medium Blue	Black	Dark Gray
75	100	100	100	100	100	0
76	100	100	100	100	100	0
77	100	100	100	100	100	0
78	100	100	100	100	100	0
79	100	100	100	100	100	0
80	100	100	100	100	100	0
81	100	100	100	100	100	0
82	100	100	100	100	100	0
83	100	100	100	100	100	0
84	100	100	100	100	100	0
85	100	100	100	100	100	0
86	100	100	100	100	100	0
87	100	100	100	100	100	0
88	100	100	100	100	100	0
89	100	100	100	100	100	0
90	100	100	100	100	100	1
91	100	100	100	100	100	0
92	100	100	100	100	100	2
93	100	100	100	100	100	3
94	100	100	100	100	100	2
95	100	100	100	100	100	3
96	100	100	100	100	100	4
97	100	100	100	100	100	3
98	100	100	100	100	100	3
99	100	100	100	100	100	0
100	100	100	100	100	100	0