# IMPROVING LANDSCAPE ARCHITECTURAL PROBLEM SOLVING: INTEGRATING GISCIENCE AND TECHNOLOGY EDUCATIONAL OBJECTIVES IN LANDSCAPE ARCHITECTURE CURRICULA

by

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# **Abstract**

The profession of landscape architecture is involved in understanding, designing and, or, implementing relationships between social and natural systems within a spatial-temporal context as defined in discipline literature and the 2005 Landscape Architecture Body of Knowledge (LABOK) study. The LABOK outlines core competencies of the profession and fundamental body of knowledge expected from graduates of Landscape Architecture Accreditation Board (LAAB) accredited degree programs.

Geographic Information Science (GIScience) is a emerging field aimed at spatial temporal problem solving and has been defined as, "a multi disciplinary research enterprise that addresses the nature of geographic information and the application of geospatial technologies to a basic scientific question" (DiBiase, 5, 2006; Goodchild, 1992). The Geographic Information Science & Technology Body of Knowledge (GIS&TBOK) (DiBiase, 121, 2007) outlines educational objectives for the emerging field of GIScience and serves as the resource for course and curriculum planning for academic and professional programs.

This study investigated where intersections exist between the spatial temporal problem solving discipline of landscape architecture and emerging field of GIScience based on the respective Body of Knowledge studies. The three phased study: 1) determined overlapping relationships between the LABOK and GIS&T BOK, 2) analyzed overlaps for their ability to help first professional degree landscape architecture programs achieve LAAB curriculum accreditation, and 3) employed a case study method to illustrate how overlaps between the LABOK and GIS&T BOK and relevant to LAAB curriculum accreditation requirements influence curricula development at Kansas Sate University.

The study established 887 relationships between the two respective Bodies of Knowledge, of which, 717 were found capable of helping achieve LAAB curriculum accreditation. The study presents key areas of intersection and overlap between LABOK and GIS&T, and provides a framework for integration of GIS&T educational objectives within first professional landscape architecture degree curriculums, in a manner to achieve LAAB curriculum accreditation.

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# **Chapter 1 – Introduction**

Generally, the profession of landscape architecture is involved in understanding, designing and, or, implementing relationships between social and natural systems within a spatial-temporal context. The Landscape Architecture Body of Knowledge Study (LABOK) outlines core competencies of the profession and fundamental body of knowledge expected from graduates of accredited degree programs with a 2003 survey of professionals. The report states (p. 12), "...this information may be used to make curricula determinations, to guide the development of continuing education activities, and to continue strong requirements for licensure through the regulatory bodies." The Landscape Architecture Accreditation Board (LAAB) is the governing body responsible for accreditation requirements in a first professional degree landscape architecture program

Foundational texts (McHarg, 109, 1992; Simonds, 98, 1997) illustrate many of the core areas of knowledge identified in LABOK illuminating connections between social (cultural) and natural systems across scales and through time. Early works are expanded in current literature (Randolph, 110, 2004; Sipes, 119, 2007; 107 Steiner, 2000; Thompson, 86, 1997; Van der Ryn, 108, 2007) on ecological design and planning to include dynamic processes within and between natural and social systems, and reference GIS (Geographic Information Systems) as tools to useful in addressing dynamic spatial temporal challenges. GIS for Landscape Architects (Hanna, 84, 1999), GIS in Site Design (Hanna, 105, 1998), and Digital Land (Sipes, 119, 2007) provide examples of the efficacy of GIS in landscape architectural problem solving.

Like LABOK, the Geographic Information Science & Technology Body of Knowledge (DiBiase, 121, 2007) (GIS&T BOK) outlines educational objectives for a GIScience discipline and serves as a resource for course and curriculum planning for academic and professional programs. The GIS&T BOK contains ten Knowledge Areas, 73 units, 329 topics, and over 1,600 formal educational objectives designed as a basis for comparing educational programs, achieving professional certification, program accreditation, and articulation agreements.

The purpose of this study is to determine overlaps between the LABOK and GIS&T BOK studies, and identify how those relationships can be integrated into a first professional degree program while achieving LAAB curriculum accreditation requirements. The study is

divided into three phases. Phase one is designed to determine the relationship between the LABOK and GIS&T BOK studies. Phase one consists of three stages. Phase 1a comprised the creation and population of a matrix comparing the two BOK studies. Phase 1b involved an analysis of the initial matrix, while phase 1c synthesized the matrix. Phase two of the study analyzes the ability of overlaps determined in phase one to help first professional degree landscape architecture programs achieve LAAB curriculum accreditation. Phase two evaluated the importance of the relationships determined in phase one based on LAAB curriculum accreditation requirements for a first professional landscape architecture degree. Phase three of the study used a case study method to illustrate how overlaps between the LABOK and GIS&T BOK relevant to LAAB curriculum accreditation requirements influence curricula development at Kansas State University.

# **Chapter 2 - Background**

# **Landscape Architecture**

Landscape Architecture is a design profession engaged in understanding and creating dynamic relationships between natural systems, and social systems. (Laurie, 1986) "The profession of landscape architecture is highly diverse in the range of issues faced by contemporary practice" (Williams, 2004, p13). Landscape architects deal with both the changes between and the integration of humans and the natural environment (Booth, 1983). "Landscape architects deal with the increasingly complex relationships between built and natural environment" (ASLA.org, 2008.). The purpose of landscape architecture is to deal with solving spatial temporal problems (Lynch & Hack, 1998). Solving spatial temporal problems is done through the locating of "objects and activities in space and time" (Lynch & Hack, 1998, p1).

The study of landscape architecture begins in a first professional degree educational program. "The first professional degree program is the principal career stage for acquiring an operational base that can later be expanded and refined" (Williams, 2004, p13). An important aspect to the profession of landscape architecture is accreditation. The LAAB is the governing body for evaluating first degree programs. The LAAB "evaluates each program on the basis of its stated objectives and compliance to externally mandated minimum standards" (ASLA.org, 2008). The mission of the LAAB it to "evaluate, advocate for, and advance the quality of education in landscape architectural programs" (ASLA.org, 2008).

# **Geographic Information Science & Technology (GIS&T)**

In 1969, Ian McHarg, a landscape architect, published *Design with Nature* which brought forth a decision making process that involved overlays and overlay analysis (LaGro, 2001). McHarg's method created individual layers for multiple natural, social, and dynamic elements to use as an evaluation tool for the environment (McHarg, 1969) and overlaid these thematic layers to determine suitability for activities at specific locations.

With innovations in technology, companies began to produce GIS based software systems that expanded on McHarg's decision making process. Today, "A GIS is a computer system for capturing, storing, querying, analyzing, and displaying geographically referenced data" (Chang, 2006, p1). Over the past 40 years, GIS has evolved and a field emerged coined

GIScience. GIScience is defined as "a multi disciplinary research enterprise that addresses the nature of geographic information and the application of geospatial technologies to a basic scientific question" (DiBiase, 2006, p5; Goodchild, 1992). Geospatial technology is "the specialized set of information technologies that handle georeferenced data" (DiBiase, 2006, p5). GIScience combined with geospatial technology forms Geographic Information Science & Technology (GIS&T) which provides reasoning for the way one approaches and solves an issue.

# Landscape Architects and the use of GIS&T

GIS&T offers spatial temporal problem solving methods and tools useful to landscape architects. Karen Hanna, author of *GIS for Landscape Architects*, stated a main advantage of GIS is "the ability to combine complex and disparate information in problem solving" (Hanna, 1998, p107). Geographic Information Science is also a valuable tool for spatial analysis. GIS technology allows for the analysis of complex spatial problems, (LaGro, 2001) and can assist with the management and analysis of spatial temporal data (Randolph, 2004). "GIS is a way to manage and analyze data in an effective and efficient manner" (Hanna, 1999, p1). GIScience & Technology can also be used for multiple types of landscape architecture projects. "GIS is used for site design, visual analysis, comprehensive planning, resource management, and public advocacy" (Hanna, 1999, p3). "LA firms with active GIS programs use them for regional planning, resort planning, park master planning, trails planning, natural resource management, viewshed analysis, and mapping" (Hanna, 1998, p99).

# The Landscape Architecture (LA) Body of Knowledge (BOK) (LABOK) Study

The LABOK study was designed to gain insight into the profession of landscape architecture and sought to answer two key questions about the profession (Williams, 2004).

- 1. What are the core Competencies shared by the profession in general that help define the profession?
- 2. What is the fundamental body of knowledge that should be expected of all graduates from accredited schools?

"LABOK is a snapshot of the profession's expectations" (Williams, 2005, p3). The following Table 2.1 summarizes Table 13 of the LABOK Report (Williams, 2004, p15) which outlined the core Knowledge Statements and Competency areas of professional practice required of first professional degree students.

Knowledge Statements	Competencies
I. Landscape Architecture History and Criticism	I. Landscape Architecture History and Criticism
II. Natural and Cultural Systems	II. Natural and Cultural Systems
III. Design and Planning Theories and Methodologies	III. Public Policy and Regulation
IV. Public Policy and Regulation	IV. Design Planning and Management at Various Scales and Application
V. Design Planning and Management at Various Scales and Application	V. Site Design Engineering: Materials, Methods, Technologies, and Applications
VI. Site Design Engineering: Materials, Methods, Technologies, and Applications	VI. Construction Documentation and Administration
VII. Construction Documentation and Administration	VII. Communication
VIII. Communication	VIII. Values and Ethics in Practice
IX. Values and Ethics in Practice	

Table 2.1 Contains Knowledge Statements and Competency domains of the LABOK study.

The LABOK study was a collection of survey results divided into the Knowledge Statements and Competencies listed above, and LABOK authors state "a professional preparation for landscape architecture must include the development of competencies- the ability of aspiring professionals to take learned knowledge and apply is to achieve successful practice" (2005, p20). The LABOK report states, "Knowledge Statements measure what *we know* (Landscape Architects (LA's)), and Competencies deal with what *we do* with what we (LA's) have learned" (Williams, 2005, p2). While the LABOK provided a basic listing of the issues (Knowledge Statements / Competencies) a landscape architect is responsible for and must understand it does not detail how to achieve understanding of these issues. Survey question responses were based on a scale from 0 to 4 for each Knowledge Statement and Competency as outlined in the following Table 2.2.

0	Unnecessary – not required at all
1	Exposure – sufficiently aware of the knowledge to be able to look it up
2	Comprehension – able to discuss the concepts involved
3	Application – able to use the knowledge to solve problems
4	Mastery – able to apply the knowledge to new problems, to integrate information
	and to create, synthesize, and evaluate solutions

Table 2.2 LABOK survey choices for Command of Knowledge at Time of Degree (Williams, 2004, p7).

Figure (2.1) on the following page depicts a typical result page from the LABOK report. The column "Command of Knowledge at time of Degree" contains results of the LABOK study pertinent to this research. The mean and standard deviation calculations in the LABOK Report for the category "Command of Knowledge at time of Degree" identify which topics of the LABOK survey results were found to be most important for a student to learn in a first professional degree program.

A Knowledge Statement or Competency with a mean of two or higher signifies comprehension of the subject desired at the time of degree completion. A Knowledge Statement or Competency with a standard deviation that would raise the mean above three, would imply a first degree graduate be able to apply subject knowledge in problem solving. A Knowledge Statement or Competency with a standard deviation that would reduce the mean below two would signify a graduate only be exposed to subject matter in a first degree program. An example of a high result Knowledge Statement that can be seen in Figure 2.1 Aesthetic principles of design mean 2.78, standard deviation 0.71.

	When should this knowledge be primarily is illustrated or stationed?  On Not required at all the program of the	what level should the knowledge be quared at completion of a first creation of completion of a first creation of completion of a first 1. Uninconsum, — not required at all 1. Exposure — sufficiently aware of the knowledge to be able to look it up 1. Core preference — all all to discuss the composit sinviving at the composition of the through the composition of the composition o	To what levet should this knowledge be obtained before an individual takes professional responsibility for his or her landscape auchinectural work?  0. Unnecessary – rist required at all 1. Exposure – aufficiently aware of the knowledge to be able to look if up.  1. Exposure – aufficiently aware of the knowledge to be able to look if up.  2. Core prehension – able to discuss the concepts involved.  3. Application – able to use the knowledge to solve problems.  4. Mastery – able to slogly the knowledge to meet problems, to integrate information and to create, synthesize and evaluate solutions.	Time Acqu	of disition	of		Time of Profes	nand of ledge at of ssional onsibility
	o ma constant program	ayronada and evapas acrosoria		Mean	SD	Mean	SD	Mean	SD
	I. Landscape Architecture History	ry and Criticism		0.000000	2000	200020	1	0,00000	37.272
1.	history of landscape architecture a			2.00	0.23	2.15	0.69	2.57	0.85
2.	historic preservation principles			2.57	1.13	1.69	0.83	2.27	1.01
				-		-	-	2-4	-
	II. Natural and Cultural Systems								
3.	land information sources			2.11	0.50	2.55	2000000	3.33	0.75
4.	patterns of land use and built form	E.		2.12	0.56	2.43	0.76	3.07	0.77
5.	natural site conditions and ecosys	tems		2.01	0.47	2.76	0.66	3.35	0.67
6.	social and cultural influences on d	esign		2.21	0.70	2.19	0.81	2.78	0.85
7.	regional hazard design considerati	ons		2.57	0.99	2.10	0.87	3.00	0.86
	III D								
	III. Design and Planning Theorie	PARTY OF THE PARTY AND ADDRESS OF THE PARTY		11.95	10.46	2.83	10.64	12.50	0.63
8.	creativity and process including de	sign theory and problem-so	olving strategies	1000	100000	70000	1000000	0.00000	57.55
9.	aesthetic principles of design			1.95	0.53	2.78	777	3.38	0.68
10.	human factors such as behavior, p		nd sensory response	2.22	0.81	2.33	-	2.92	0.79
11.	natural factors such as ecological r			2.02	0.58	2.53		3.14	0.78
12.	relationship between human and n and urban ecology	raturai systems such as res	ource conservation, habitat restoration and creation,	2.35	0.86	2.36	0.79	3.04	0.81
13.	influence of context on design, plan	nning and management de	vie one	2.50	0.98	2.45	0.76	3.24	0.78
14.	research methods including data c			2.44	0.91	2.37	0.93	AT THE STATE OF	1.00
15.	therapeutic aspects of design	onceron, interpretation, and	a approacion of results	2.87	1.41	1.66	17,072,70	2.23	1.04
16.	communication and education met	thods, including sharing kno	owledge and evaluating outcomes	2.66	1.29	2.15	0.000	2.78	1.02
	commencement and coulded me	meae, meneaning amaining rese	anneage serie examinating seasoning	2.00	1.23	20.70	0.00	20.0	1102
	IV. Public Policy and Regulation	E							
	iv. Public Policy and Regulation			1	14 40	1	In ac	10.00	10.00
17.		at affect the use and develo	opment of land	3.00	1.19	1.80	0.85	3.02	0.83
17. 18.			opment of land	3.00	1.19	1.80	-	2.98	0.83

TABLE A-MEAN RATINGS FOR KNOWLEDGE STATEMENTS

Figure 2.1 Typical Results Page from the LABOK study. The highlighted column "Command of Knowledge at Time of Degree" represents the category most relevant to this study and to first professional degree students. Each row represents a Knowledge Statement or Competency. A complete list of all Knowledge Statements and Competencies are found in Appendix A.

# The Geographic Information Science and Technology (GIS&T BOK)

The GIS&T BOK was developed as part of the Geographic Information Science and Technology Model Curricula Initiative and contains a "comprehensive inventory of the GIS&T knowledge domain" (DiBiase, 2006, p1). The GIS&T BOK helps "bridge the gap between the GIS&T higher education community, and the practitioners, employees, and clients who populate the various GIS&T professions" (DiBiase, 2006, p7). The GIS&T BOK is an attempt to "specify a comprehensive body of knowledge that defines the GIS&T domain" (DiBiase, 2006, p7). The

GIS&T BOK consists of very detailed points on how to achieve and understand topics of the GIS&T BOK. The topics are divided among units which make up Knowledge Areas.

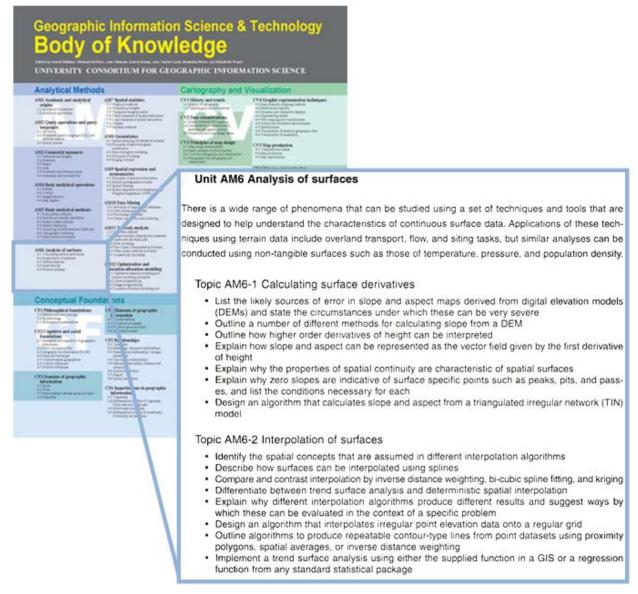


Figure 2.2 GIS&T BOK document cover illustrating Knowledge Areas and sample page from the Analytical Methods Knowledge Area illustrating Unit AM6 Analysis of Surfaces and topics and topical objectives. Each of the 10 Knowledge Areas contains a varying number of units and topics (329 total).

# The Relationship between LABOK and GIS&T

The LABOK and GIS&T BOK similarly define professional landscape architecture and GIS&T curricula. Both studies intended to define current and relevant theory, methods and topical areas of the disciplines and provide a framework for student's knowledge of subject matter in the respective professional discipline. Landscape architects as illustrated in the literature are involved in solving spatial temporal problems and GIS&T provides theory, methods and technology useful in solving spatial temporal problems undertaken by landscape architects.

# **Purpose and Hypothesis**

The purpose of this study was to first determine where there are intersections and relationships between the Geographic Information Science and Technology Body of Knowledge (GIS&T BOK) study and the Landscape Architecture Body of Knowledge (LABOK) study and second, illuminate how identified overlaps can be integrated into a first professional degree landscape architecture curriculum. Research aimed to discover relationships between the two BOK studies and pinpoint areas to positively influence the education of a first professional degree landscape architecture student by embedding relevant GIS&T BOK Knowledge Areas, units and topics. Based on the results of the relationship study and LAAB accreditation standards a case study method was used to evaluate the existing integration of GIScience and Technology in the Kansas State University first professional degree program.

The author hypothesizes there are overlaps between the LABOK and GIS&T BOK studies relevant to professional landscape architecture problem solving and essential to training landscape architects in professional degree programs.

# Research Questions

- 1. Where are there intersections or overlap relationships between the LABOK and GIS&T BOK defined Knowledge Areas based on literature supporting the use of GIScience for landscape architects and descriptions of Knowledge Areas found in LABOK and GIS&T BOK?
- 2. Which of the LABOK Knowledge Statements and Competencies found to contain overlaps with the GIS&T BOK achieve LAAB accreditation standards particularly dealing with computer applications and technology?

3. Is the Kansas State University first professional degree landscape architecture program appropriately integrating GIScience and Technology as a problem solving tool based on LABOK & GIS&T BOK and current literature regarding GIScience in landscape architectural problem solving?

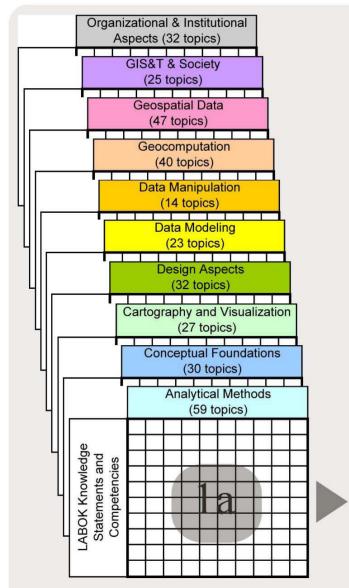
# **Overview of Research Process**

The study was divided into three phases with each phase building upon prior phase results. The first phase dealt directly with the relationship between Landscape Architecture and GIScience and Technology bodies of knowledge. The relationship study of the LABOK and GIS&T BOK is documented and analyzed in a matrix. The second phase incorporates LAAB accreditation standards alongside the LABOK Knowledge Statements and Competencies to indicate relevancy to accreditation of first professional degree landscape architecture programs. The third and final phase compared overlapping LABOK and GIS&T BOK Knowledge Areas found important in LAAB accreditation standards with the learning objectives found in the Kansas State University Tech Module sequence of courses.

# **Chapter 3 - Methodology**

# Introduction

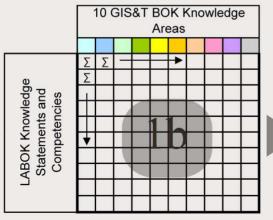
The study involved three phases. Phase I was designed to identify where the LABOK and GIS&T BOK intersect. The initial matrix (1a) determined the presence (1) or absence (0) of a relationship between the BOK's. The second matrix (1b) summarized the results of the initial matrix for each of the 10 GIS&T BOK Knowledge Areas and 110 LABOK Knowledge Statements and Competencies. The third matrix (1c) indentified only LABOK Knowledge Statements and Competencies and GIS&T BOK topics that intersected. Phase II examined what LAAB curriculum accreditation requirements are achieved by remaining LABOK topics. This phase concentrated on the LAAB curriculum accreditation requirement *computing applications* and other advanced technology. This information was used to determine which remaining LABOK Knowledge Statements and Competencies achieve (1) or do not achieve (0) the LAAB accreditation requirement *computing applications and other advanced technology*. Phase III evaluated the Kansas State University Tech Module Sequence comparing matrix synthesis results with learning objectives in the Tech Module course syllabi.



# 1a. Matrix Creation & Population

10 Matricies (Excel Worksheets) one for each GIS&T BOK Knowlege Area with units and topics along horizontal axis. 110 LABOK Knowledge Statements and Competencies down vertical axis. Answered by entering (0) absence or (1) presence of overlap in corresponding cells.

Summarized Columns and Rows by count and average of relationship presence



# 1b. Matrix Analysis

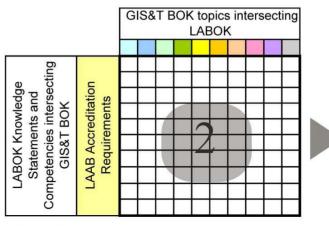
Single Matrix (Excel Worksheet)
10 GIS&T BOK Knowledge Areas
Horizontally
110 LABOK Knowledge Statements and
Competencies vertically
Summarization horizontally and
vertically

# Competencies intersecting LABOK Competencies intersecting GIS&T BOK GIS\$T BO

# 1c. Matrix Synthesis

10 Matricies merged into single Matrix (Excel Worksheet)
Contains only LABOK Knowledge
Statements and Competencies and
GIS&T BOK units and topics containing at least one overlap.

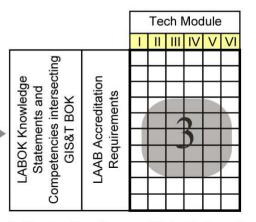




# 2. LAAB Curriculum Accreditation

Single Matrix (Excel Worksheet) GIS&T BOK units and topics intersecting LABOK horizontally

LABOK Knowledge Statements and Competencies intersecting GIS&T BOK vertically Highlighted column used to determine which LABOK Knowledge Statements and Competencies achieve (1) or do not achieve (0) LAAB curriculum accreditation requirement computer applications and other advanced technology



# 3. Evaluation Kansas State University Single Matrix (Excel Worksheet) 6 Tech Module courses horizontally across top

LABOK Knowledge Statements and Competencies intersecting GIS&T BOK and achieving LAAB curriculum accredidation requirement *computer applications and other advanced technology* vertically Detemined which syllabi objectives are achieved

Objective number placed in corresponding cell No objective (0)

Phase 1a. Matrix Creation and Population



Figure 3.2 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase 1a.

In the first phase a matrix created in Microsoft Excel 2003 documented the answer to research question one aimed at determining overlapping relationships between the LABOK and the GIS&T BOK and served as the basis for subsequent stages of the study. Literature in the domain of landscape architecture indicating relevance or value of GIScience and Technology in landscape architecture problem solving and descriptions provided in both the LABOK Knowledge Statements and Competencies and GIS&T BOK Knowledge Area units and topics were evaluated to determine presence or absence of overlap between LABOK and GIS&T BOK Knowledge Areas. The matrix was constructed with the LABOK Knowledge Statements and Competencies as the vertical or left axis (see Table 2.1 p. 14, Figure 2.1 p. 16, and Appendix A for all 110 knowledge and Competency measures) and the GIS&T BOK Knowledge Areas, units and topics along the horizontal or top axis (see Figure 2.2 p.17 for overview and Appendix B for a list of all 10 Knowledge Areas, units and 329 corresponding topics). In total, the matrix consists of 36,190 cells. Presence of an overlap or intersection was indicated as 1 in the matrix and a lack of overlap was assigned a 0.

The initial design concept, as stated, contained 110 LABOK (Appendix A) Knowledge Statements and Competencies along the left or vertical axis and all 329 GIS&T BOK Knowledge Areas, units and topics (Appendix B) along the top or horizontal axis. Due to a limitation of maximum number of columns (256) in Excel 2003, the matrix was broken into ten separate matrices or Excel worksheets to accommodate the 329 GIS&T topics. Each worksheet contained all 110 LABOK Knowledge Statements and Competencies along the vertical axis and only one GIS&T BOK Knowledge Area and corresponding units along the horizontal axis as illustrated Phase 1a in Figure 3.3.

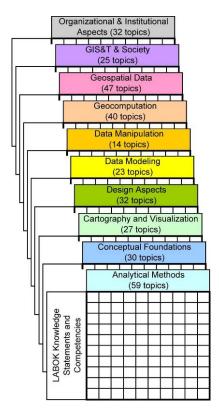


Figure 3.3 Setup for the initial matrix involved ten separate Excel worksheets. Each worksheet contained one GIS&T Knowledge Area and all 110 LABOK Knowledge Statements and Competencies.

As illustrated in Figure 3.3, each of the ten worksheet tabs were named according to the GIS&T BOK Knowledge Area being evaluated. The horizontal or top axis (columns or fields) were organized to match the order and color scheme from the GIS&T BOK cover for each Knowledge Area with cells merged across the top of all corresponding units under each Knowledge Area. Knowledge Area units were designated with two letters representing the Knowledge Area followed by a number representing the corresponding unit. Topics of units were entered by topic title as vertical text under each corresponding merged unit cell. Again all Knowledge Areas, units and topics are found on the front and back cover of the GIS&T BOK, within the text at the start of each unit and also in Appendix B of this document.

Figure 3.4 illustrates a completed portion of the first GIS&T BOK Knowledge Area Analytical Methods and Units AM1, AM2 and AM3 along the top axis and first and second Knowledge Areas of the LABOK along the left axis. Each LABOK Knowledge Statement and Competency were color coded based on their mean. Knowledge Statements and Competencies

with a mean of 2.00 or higher received an orange color. Knowledge Statements and Competencies with a mean between 1.00 and 2.00 received a color of yellow-orange. Knowledge Statements and Competencies with a mean below 1.00 were colored yellow. The color coding of Knowledge Statements and Competencies helped identify the level of relevance to a first degree education.

·			LABOK								S&T E					
					mand of					Analy	tical N	<i>l</i> letho	ds			
					ge at time of gree	Αľ	W1		AM2				,	SMA		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Proximity & Distance Decay	Adjacency & Connectivity
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	1	0
	Natural and Cultural		land information sources	2.55	0.77	0	0	0	0	0	0	0	0		0	0
			patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	0	1	-	1	1
			natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	0	1			0	0
	Systems		social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0		0 0	1	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0
5.0000000000000000000000000000000000000			creativity and process including design theory and problem -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE			aesthetic principles of design	2.78	0.71	0	0	0	0	0	1	1	1	1	0	0
STATEMENTS			human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	1	0
		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	0	1
	Design and Planning Theories and		relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	1	0
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	1	0	0	1	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	1	0	0	0	0	0	0	0

Figure 3.4 A completed example of the GIS&T Knowledge Area Analytical Methods units AM1, AM2, AM3.

# Matrix Population

Population of presence or absence of a relationship between the LABOK and GIS&T BOK in the matrix was based on relevant literature that pertained to a first professional degree program spanning the subjects of Landscape Architecture and GIScience and Technology along with topic objectives found in the GIS&T BOK. Each GIS&T BOK topic contains a varying number of objectives established to achieve topic understanding as illustrated in Figure 2.2. Literature was used as the basis to determine presence of a relationship between the topics. The presence or absence of a relationship was signified by inserting a 1 (presence) or 0 (absence) in the corresponding matrix cell. Inserting a 1 in the cell represented a relevant relationship between the GIS&T BOK topic and the LABOK Knowledge Statement or Competency.

Inserting a 0 in the cell represented no relationship between the topics. The binary answer system was used to more easily manage the large extent of the matrix, and allowed simple summarization of the results. An example of the presence and absence of relationships can be found in Figure 3.4.

Each matrix cell in of each of the ten worksheets (36,190 cells total) was populated using the criteria established above. Upon completion of the matrix sum and averages for each row and column were derived. Summing across rows and columns identified which BOK categories displayed the strongest relationships.

Due to the Microsoft Excel 2003 256 column limit, all 329 columns could not be displayed in a single matrix. Therefore, the results were merged using GIS Raster techniques. Merging the ten worksheets of the initial matrix incorporated the application of GIS into the study. This action demonstrated the versatility of GIS and illustrates the importance of GIS beyond GIS as a spatial visualization tool. Directions for merging results in ESRI's ArcMap GIS program can be found in Appendix D with results illustrated below.

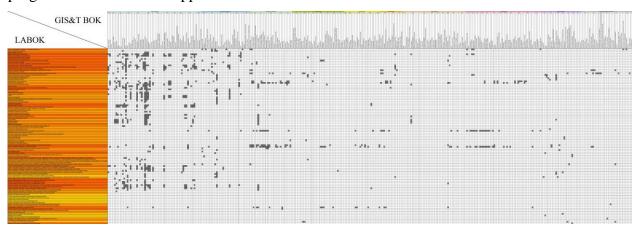


Figure 3.5 The entire matrix after being generated using ArcMap.

Figure 3.5 displays the entire extent of the phase 1a matrix, 36,190 cells. Dark areas represent the presence of a relationship. Blank regions represent the absence of a relationship between LABOK Knowledge Statements and GIS&T BOK topics. Production of the whole matrix revealed patterns and relationships across the entire matrix.

# Phase 1b. Matrix Analysis



Figure 3.6 A simple flow diagram illustrating the sequence of phases. Highlighted is the current Phase 1b.

This stage of the study summarized the initial matrix. Summarizing the initial matrix identified LABOK Knowledge Statements and Competencies and GIS&T BOK Knowledge Areas with the presence/absence of a relationship and the strength of that relationship.

LABOK Knowledge Areas and Competencies and GIS&T BOK Knowledge Areas with strong positive relationships (multiple categorical overlaps) distinguished areas to be examined for effectively incorporating GIScience into a first professional degree curriculum.

The analysis began with a new Excel worksheet. LABOK Knowledge Statement and Competency information was placed on the vertical axis. Horizontally each of the ten GIS&T BOK Knowledge Areas was labeled as illustrated in Figure 3.7. Corresponding cells in the GIS&T Knowledge Areas and LABOK Knowledge Statements and Competencies containing the summarization information from the previous Phase 1a were placed in a new worksheet.

Numeric values represent the count of relationships in each LABOK Knowledge Statement and Competency in a GIS&T BOK Knowledge Area. Each GIS&T BOK Knowledge Area and LABOK Knowledge Statement and Competency were tallied.

			LABOK													Knowledge								
Knowledge Statement / Competency	Domains		Knowledge Statements / Competencies	Knowle	nmand of edge at time Degree			GI	S&T B	OK Kr	owled	ge An	eas			Statements and Competency								
Division				Mean	Standard Deviation		CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	(Horizontal) Sum								
	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	6	2	0	0	0	0	4	0	2	14								
			2	historic preservation principles	1.69	0.83	1	3	0	0	0	0	0	0	0	0	4							
	Natural and Cultural Systems			3	land information sources	2.55	0.77	3	2	0	0	0	0	0	0	0	0	5						
WHOLE EDGE		4	patterns of land use and built form	2.43	0.76	26	2	0	0	0	1	1	3	0	0	33								
KNOWLEDGE STATEMENTS										5	natural site conditions and ecosystems	2.76	0.66	20	4	0	0	0	0	1	0	0	0	25
			6	social and cultural influences on design	2.19	0.81	4	2	0	1	0	0	0	0	0	0	7							
		7	regional hazard design considerations	2.1	0.87	5	0	0	0	0	0	0	0	0	0	5								

Figure 3.7 Displays the arrangement of the matrix analysis.

Summarizing the results provided a total count of the overlaps from the initial matrix. This also identified LABOK Knowledge Statements and Competencies that contained no relationship with the GIS&T BOK topics. Six Knowledge Statements and thirteen Competencies from the LABOK did not contain a relationship with the GIS&T BOK.

# Phase 1c. Matrix Synthesis



Figure 3.8 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase 1c.

The third stage of phase one was designed to extract positive results from the initial matrix. The outcome of this stage was used in the following phase. The third matrix was constructed with LABOK Knowledge Statements on the vertical axis and GIS&T BOK Knowledge Areas, unit designations, and topics across the horizontal axis. Only Knowledge Statements and Competencies identified in Phase 1b as containing an overlap were included. Likewise, only GIS&T BOK units and topics that contained overlaps were included. These units and topics were determined by the column sum derived in Phase 1a. To fit the extent of all GIS&T topics into the worksheet, information was transferred into a new worksheet one Knowledge Area at time while removing those with no result before including the following Knowledge Area. The completed matrix contained 170 GIS&T BOK topics and ninety-one LABOK Knowledge Statements/Competencies. Results were then used for the remaining phases.

#### Phase Two



Figure 3.9 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase two.

The second phase of the research utilized analysis of overlapping Knowledge Areas and evaluated importance of the overlapping areas based on LAAB curriculum accreditation requirements for a first professional landscape architecture degree. These results were stored in

a third iterative matrix denoting LAAB accreditation importance alongside LABOK Knowledge Statements and Competencies on the left axis. See Figure 3.10 Diagram of phase two.

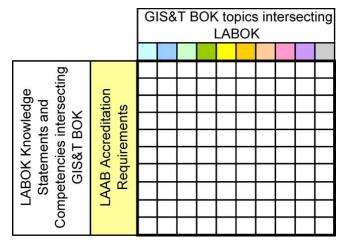


Figure 3.10 A diagram of the matrix arrangement for phase two

# **LAAB Curriculum Accreditation Integration**

The 2005 LAAB Accreditation Standards Procedures state that a curriculum in landscape architecture should include ten professional domains (LAAB, 2005, p13). These domains are:

- 1) Landscape architectural history and theory\*
- 2) Natural and cultural systems\*
- 3) Design theories, methodologies, and applications\*
- 4) Landscape planning and management at various scales and applications\*
- 5) Site design and construction such as grading, drainage, and circulation\*
- 6) Communication in written, verbal, and visual applications\*
- 7) Plants and ecosystems at various scales and situations\*
- 8) Construction materials, methods, technologies, and applications\*
- 9) Professional practice methods, values, and ethics
- 10) Computing applications and other advanced technology.

The LABOK study incorporates eight LAAB domains (denoted with asterisk in list above) into the Knowledge Statements and Competencies. The LABOK Knowledge Statements and Competencies provide a framework for comprehension of the LAAB domain. Incorporating principles of LABOK Knowledge Statements and Competencies in a curriculum assists in achieving LAAB accreditation. As denoted the LAAB domain *computing applications and other advanced technology* was not incorporated in the LABOK study. Phase two identified

which LABOK Knowledge Statements and Competencies applied to the domain of *computing* applications and other advanced technology.

Knowledge Statements and Competencies with established relationships to the GIS&T BOK were determined in phase 1a. Those Knowledge Statements and Competencies were then analyzed for their ability to incorporate principles of GIS&T in first professional degree curriculum while achieving LAAB accreditation. This provided a structure for the evaluation of current curriculum incorporations of GIScience.

Using the matrix with results from phase 1c, a column was inserted between the standard deviation column and the first GIS&T BOK topic Academic Foundations as shown in Figure 3.11. The new column was labeled for the LAAB domain *computing applications and other advanced technology*.

			LABOK			LAAB		GIS&	т вок	
				Corr	nmand of	br VI	An	alytica	al Metho	ods
					dge at time Degree	ations and chnology	AM	<b>V</b> 11	AM	2
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing application other advanced tech	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries
			land information sources	2.55	0.77	1	0	0	0	0
Knowledge	Natural and Cultural		patterns of land use and built form	2.43	0.76	1	1	1	0	0
Statements	Systems		natural site conditions and ecosystems	2.76	0.66	1	0	1	0	0
Statements	- Systems		social and cultural influences on design	2.19	0.81	1	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0

Figure 3.11 Displays the first Knowledge Statement Domain of the phase two matrix with the column for *computing applications and other advanced technology* highlighted.

Again, literature was consulted along with the GIS&T BOK to determine which LABOK Knowledge Statements and Competencies applied to the domain *computing applications and other advanced technology*. Determination of compatibility depended on the ability of the LABOK Knowledge Statement or Competency to help achieve educational understanding through GIScience. This determination was based on relevant literature examples or utilization of the technology in comprehending the Knowledge Statement or Competency. Knowledge Statements and Competencies deemed appropriate for meeting the LAAB accreditation requirement *computing applications and other advanced technology* received a mark of (1). Knowledge Statements and Competencies determined irrelevant to the LAAB accreditation requirement *computing applications and other advanced technology* received a mark of (0). Knowledge Statements and Competencies that received a (0) were then removed. Removing

rows and columns with no relationship to the LAAB requirement changed the sum of sixteen GIS&T BOK topics to zero which were also removed from the phase two matrix. The resulting matrix contained 33 Knowledge Statements and 16 Competencies with relationships established to 154 GIS&T BOK topics capable of achieving the LAAB curriculum accreditation requirement computing applications and other advanced technology. Results were then used in the final phase evaluating the Kansas State University Tech Module Series.

#### **Phase Three**



Figure 3.12 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase three.

The third and final phase of this study employed case study method to illustrate how determined LABOK Knowledge Statements and GIS&T BOK Knowledge Area overlaps also deemed important to LAAB accreditation standards can influence landscape architecture curricula development at Kansas State University. Matrix synthesis results were used to investigate GIScience and Technology Knowledge Area integration in the accredited first professional landscape architecture degree at Kansas State University. The evaluation used learning outcomes defined for the six Landscape Architecture Tech Module sequence courses (LAR 510, LAR 520...LAR 560) to determine the presence or absence of GIS&T BOK relevant content in the sequence, and to recommend improvements to further integrate relevant GIS&T BOK knowledge into the curriculum at Kansas State. See Figure 3.13 Diagram of Phase 3.

		Tech Module											
		1	11	111	IV	٧	VI						
ting													
LABOK Knowledge Statements and Competencies intersecting GIS&T BOK	AAB Accreditation Requirements												
wle s al ntel	dita				3								
ABOK Knowledg Statements and betencies interse GIS&T BOK	AB Accreditati Requirements	_				_							
OK I tem enci	3 Ac			$\vdash$			Н						
ABC Sta Sete	AAE Re						Н						
L Omp	コ												
ŭ													

Figure 3.13 A diagram of the matrix construction for phase three.

# **Evaluation of Kansas State University's Tech Module Series**

In 2006, Kansas State University began a six course Tech Module sequence for teaching computer applications. Tech Module course content coincides with landscape architectural problems assigned in parallel semester courses in the first professional degree program. The final phase of this study evaluated the Tech Module sequence at Kansas State comparing matrix synthesis results with learning objectives from the initial Tech Module course syllabi.

Phase three was documented in a new Microsoft Excel 2003 worksheet with LABOK Knowledge Statement and Competency information along the vertical axis. Each Knowledge Statement and Competency was determined in phase two as possible of helping achieve the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. On the horizontal axis six columns were designated for each of the Tech Module courses. An example can be seen in Figure 3.14.

			LABOK		2.2	L	AAB							
Knowledge				Knowle	nmand of dge at time Degree	ter	s and	ogy	Т	EC	H M	IOD	UL	E.
Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Compu	ad y	technolo	-	II	Ш	IV	v	VI
		3	land information sources	2.55	0.77		1							
Knowledge	Natural and	4	patterns of land use and built form	2.43	0.76		1							
Statements	Cultural	5	natural site conditions and ecosystems	2.76	0.66		1							
Glatements	Systems	6	social and cultural influences on design	2.19	0.81		1							
		7	regional hazard design considerations	2.1	0.87		1							

Figure 3.14 Displays the arrangement of the phase three worksheet.

Each Tech Module course syllabus contains learning objectives related to parallel course problems and builds upon learning from prior Tech Modules. Each Tech Module has a varying number of objectives based on semester curriculum requirements. Each Tech Module course contains learning objectives that directly involve GIScience. Prior to evaluating the Tech Module courses it was determined which learning objectives apply to GIScience and Technology and were used in the case study. Objectives determined to incorporate GIScience are illustrated in Table 4.2 found on page 31 in the results section with a complete listing of objectives in Appendix C.

The objectives selected from the Tech Module course syllabi were chosen based on a direct mention of GIScience or contained topics directly related to GIScience as indicated by literature review and GIS&T BOK descriptions. After identifying the objectives that involved GIScience the matrix was populated by placing the number(s) of the objective(s) that applied to the LABOK Knowledge Statement or Competency in the corresponding cell. A number of Tech Modules contained multiple objectives that applied Knowledge Statements and Competencies. Three Knowledge Statements and one Competency did not have any objectives that apply and these can be found on page 30. When no objective relationship was established between the Knowledge Statements/Competencies and Tech Module objectives a (0) was marked in the corresponding cell.

Results identified areas the Kansas State University Tech Module sequence effectively incorporating GIScience into learning objectives and exposed areas where improvements could be made.

# **Chapter 4 - Results**

# Introduction

Results of the study focused on the relationship between Landscape Architecture and GIScience for a first professional degree Landscape Architecture student. Results are reported individually for each phase of the study. Phase one results dealt with the relationship between the LABOK and GIS&T BOK. Phase two results concentrated on the use of phase one results to meet LAAB curriculum accreditation. Phase three results comprised the evaluation of the Kansas State University Tech Module sequence.

# Phases One: the relationship between the LABOK and the GIS&T BOK

Phase one dealt with the relationship between the LABOK and the GIS&T BOK. The LABOK contained 110 topics. An example of matrix results can be found in Figure 4.1 with complete results of the initial matrix can be found in Appendix E.

												S&T E										_	=				
				mand of	_										Analy	tical I	Method	is	_								
				ge at time of egree	Al	И1		AM2				,	АМЗ				Al	И4					- 09	AM5	1,0		
Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Spootpoque	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
	Landscape Architecture	1 history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History and Criticism	2 historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	\$0.878 -0.4-0-32	3 land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4 patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	1	0	1	1	1	0	0	0 0 0 0 0 0 0 1 1 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0
	Cultural	5 natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	1	1
	Systems	6 social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	
		7 regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0
		creativity and process including design theory and problem 8 –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
KNOWLEDGE		9 aesthetic principles of design	2.78	0.71	0	0	0	0	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1
STATEMENTS		human factors such as behavior, perception, psychological 10 and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
	80,07.88 8	11 natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1
	Design and Planning Theories and	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	1	0	0	1
	Methodologies	influence of context on design, planning, and management 13 decisions	2.45	0.76	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1
		research methods including data collection, interpretation, and 14 application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1		15 therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		communication and education methods, including sharing 16 knowledge and evaluating outcomes	2.15	0.99	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 4.1 A portion of the completed phase 1a matrix. Represented are the first sixteen LABOK Knowledge Statements with overlaps to topics in the GIS&T BOK Knowledge Area Analytical Methods (AM) units AM1-AM5 (23 topics). Areas that demonstrated overlap received a mark of (1) are highlighted.

The matrix analysis filtered results of the initial matrix to identify relationships. An example of the matrix analysis can be found in Figure 3.7. Complete results of the matrix analysis can be found in Appendix F. Of the 110 LABOK Knowledge Statements and Competencies, 19 did not overlap with GIS&T BOK topics. Of the 329 GIS&T BOK topics 170 were found to overlap with LABOK Knowledge Statements and Competencies eliminating 159 GIS&T BOK topics determined to have no presence of overlap to the LABOK Knowledge Statements and Competencies. In total, the initial matrix contained 887 overlaps between LABOK Knowledge Statements (703) and Competencies (184) and GIS&T BOK topics. LABOK Knowledge Statements and Competencies overlapped between one and fifty-five times with individual GIS&T BOK topics. Figure 4.2 demonstrates the distribution of overlaps between LABOK categories and GIS&T topics in the initial matrix results.

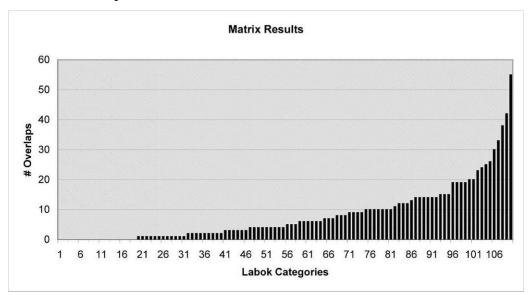


Figure 4.2 Overlap distributions between LABOK Knowledge Statements and Competencies with GIS&T BOK topics. The 110 LABOK Knowledge Statements and Competencies reside on the horizontal axis based on amount of relationships with GIS&T BOK topics. The vertical axis represents number of GIS&T BOK overlaps.

In Figure 4.2 the highest overlapping LABOK Knowledge Statements and Competencies are located on the right. The Knowledge Statement with the most GIS&T BOK topic overlaps was Graphic presentation techniques, systems & symbols. This LABOK Knowledge Statement, with a high mean of 2.71 (LABOK Report), contained 55 overlaps with GIS&T BOK topics.

This Knowledge Statement established relationships within each of the ten GIS&T Knowledge Areas. The strong relationship between Graphic presentation techniques, systems, & symbols and GIS&T BOK topics could be based on both disciplines using graphics as a visual communication and assessment tool for problem solving. Other LABOK Knowledge Statements and Competencies with strong relationships to the GIS&T BOK include: Visual resource assessment mean 1.91 (LABOK), 42 overlaps, Geographic coordinate systems and layout techniques mean 1.90 (LABOK), 38 overlaps, Patterns of landuse and built form mean 2.43 (LABOK), 33 overlaps, and Photogrammetry and remote sensing mean 1.47 (LABOK), 30 overlaps. Each of these LABOK Knowledge Statements and Competencies demonstrated strong visual linear relationships across the matrix.

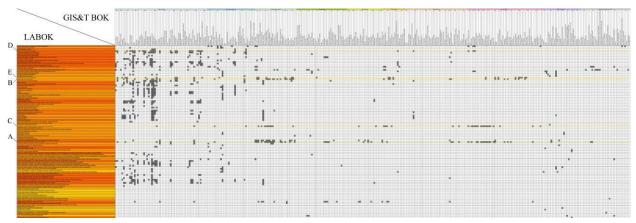


Figure 4.3 Highlights the LABOK Knowledge Statements and Competencies that exhibited the strongest relationships to the GIS&T BOK. A) Graphic presentation techniques, systems, & symbols B) Visual resource assessment C) Geographic coordinate systems and layout techniques D) Patterns of landuse and built form E) Photogrammetry and remote sensing

According to Figure 2.2 each of these Knowledge Statements and Competencies require comprehension or application from a first professional degree graduate. This provides the first evidence of the value of GIScience and Technology to a first professional degree program.

Of the ninety-one LABOK Knowledge Statements (62) and Competencies (29) with at least one overlap to GIS&T BOK topics, forty Knowledge Statements/Competencies contained a mean of 2.00 (LABOK) or greater. These are the Knowledge Statements and Competencies of most importance to a first professional Landscape Architecture degree education. Forty-six of the

Knowledge Statements and Competencies had a mean between 1.00 and 2.00 (LABOK) signifying comprehension is expected upon graduation of a first professional degree. Five Competencies with a mean below 1.00 (LABOK) or would only require exposure from a graduate contained overlaps.

Every Knowledge Statement and Competency in the LABOK with a mean above 2.00 (LABOK) contained least one overlap with GIS&T BOK topics. This demonstrated every Knowledge Statement and Competency considered to be comprehendible by a first degree graduate can in some way incorporate GIScience and Technology as a learning tool. Twenty-one of the Knowledge Statements and Competencies contained a mean with standard deviation that would imply a graduate "be able to use the knowledge to solve problems" (Williams, 2004, p7). Twelve of fifty-eight Knowledge Statements and Competencies with a mean between 1.00 and 2.00 (LABOK) did not contain overlaps with GIS&T BOK topics. Seven of twelve Knowledge Statements and Competencies with a mean below 1.00 (LABOK) did not have a relationship to GIS&T BOK topics. Results showed ninety-one of 110 LABOK topics are able to utilize GIScience and Technology as an educational tool while helping students comprehend the fundamentals of Landscape Architecture.

The largest GIS&T BOK Knowledge Area with 59 topics was *Analytical Methods*. This Knowledge Area demonstrated the strongest relationship to LABOK Knowledge Statements and Competencies. Topics of the *Analytical Methods* Knowledge Area comprised 500 overlapping results. The large number of results could be attributed to the *Analytical Methods* Knowledge Area "encompassing a wide variety of operations whose objective is to derive analytical results" (DiBiase, 2006, p43). The *Analytical Methods* Knowledge Area was also the largest Knowledge Area with more topics than any other Knowledge Area. Divisions in the *Analytical Methods* section such as AM3 Geometric Measures, AM4 Basic Analytical Methods, and AM6 Analysis of Surfaces contain topics that parallel fundamentals of Landscape Architecture. Other GIS&T BOK Knowledge Areas contained between 17 and 98 overlaps. Relationship distribution can be found in table 4.1 on the following page.

Knowledge Area	# of Topics in Knowledge Area	# of relationships within Knowledge Area
Analytical Methods (AM)	59	500
Conceptual Foundations (CF)	30	89
Cartography & Visualization (CV)	27	98
Design Aspects (DA)	32	25
Data Modeling (DM)	23	17
Data Manipulation (DN)	14	26
Geocomputation (GC)	40	19
Geospatial Data (GD)	47	62
GIS&T & Society (GS)	25	31
Organizational & Institutional Aspects (OI)	32	20

Table 4.1 Distribution of the matrix overlaps by GIS&T BOK Knowledge Areas.

Based on relationship distribution there are LABOK topic(s) that relate to each of the ten GIS&T BOK Knowledge Areas. An example of the matrix synthesis can be seen in Figure 4.4. Completed matrix synthesis results can be found in Appendix G.

			LABOK	,		_										т во								
					nmand of	-	_	_	_	_				An	alytica	I Met	nods		_					
					dge at time of Degree	А	М1	А	M2			AM	13				AM4					AM5		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay Adiacency &	Connectivity	Buffers	Overlay	Man Alpahra	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation Spatial Process Models
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0 0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	1	0	0	0	0 0	0	0	0	0	0	0 0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0 0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	1	0	1	1	1		0 0		1	1	1	0	0 1
	Cultural	5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	1	0	0	0	0	1		0 0		0	1	1	0	1 1
	Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	1	0	0		0 0	0	0	1	0	0	0 0
	-,	7	regional hazard design considerations	2.1	0.87	0	0		0	0	0	0	0		0	1		0 0		0	0	0	0	1 0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	0	0		0	0	0	0	0		0	1	0	0 0		0	0	0	1	0 0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	1	1	1	1	0	0	1	0	0 1	0	0	0	0	0	0 1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	1	0	1	0	0 0	0	0	0	0	0	0 1
	Design and	11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	1		0	1 1	0	1	1	0	0	0 1
	Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	1	0	1	0	1 0	0	0	1	1	0	0 1
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	1	0	0	1	0	1	0	0 0	0	0	1	0	0	0 1
MINISTER COOK		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	1	0	0 0	0	0	0	0	0	0 0
KNOWLEDGE STATEMENTS		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	1	0	0	0	0	1	0	0 0	0	0	0	0	0	0 0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0 0
1		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0		0	0	0	0	0		0			0 0		0	0	0	0	0 0
1	Public Policy	18	political and regulatory approval processes	1.67	0.92	0	0		0	0	0	0	0					0 0		0	0	0	0	0 0
1	and Regulation	19	land and development economics	1.47	0.83	0	0		0	1	0	0	0		0			0 0		0	0	0	0	0 0
1		20	emerging trends and issues	1.65	0.83	0	0		0	0	0	0	0					0 0		0	0	0	0	0 0
1		21	photogrammetry and remote sensing	1.47	0.84	0	1	0	1	0	1	1	0					0 0		0	0	1	0	0 0
		22	visual resource assessment	1.91	0.88	0	1	0	0	1	0	1	0			0		0 0		0	0	0	1	0 0
1		23	agricultural and rural landscape analysis	1.68	0.85	0	1	0	0	0	0	1	0		0			0 0	0	0	- 1	1	0	0 1
		24	urban landscape	2.17	0.71	0	0	0	0	1	0	1	0	1	0		0	1 1	1	0	1	0	0	0 1
1	Design,	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0		0	-1	0	0	0	1	1			0 0		0	- 1	0	0	1 0
1	Planning and	26	conservation of natural resources	2.33	0.8	1	0		1	0	0	0	0		0			0 1	0	0	1	0	1	1 0
1	Management at		historic preservation	1.73	0.76	0	0		0	0	0	0	0					0 0		0	0	0	0	0 0
1	Various Scales		ecological planning principles	2.23	0.8	0	0		0	0	0	0	0		0			0 1	0	0	1	0	1	1 0
1	and Applications		Water resource management	1.91	0.84	1	0	0	0	0	0	0	0					0 1	0	0	- 1	0	0	1 0
1		30	wetland	1.78	0.83	0	0		0	0	0	0	0		0			0 1	0	0	1	0	0	1 0
1		31	floodplain management	1.8	0.86	0	0		0	0	0	0	0		0			0 1	0	0	1	0	0	1 0
1		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1,43	0.84	0	0		0	0	0	0	0					0 1	0	0	1	0	0	0 0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	1	0	0 0	0	0	1	0	0	1 0

Figure 4.4 A sample of the matrix synthesis. Represented are the first 33 LABOK Knowledge Statements and 21 GIS&T BOK topics that contained relationships. Highlighted are the areas of overlap.

### Phases Two: LAAB curriculum accreditation requirements

As indicated in the methodology, phase two of the study dealt only with areas of LABOK and GIS&T BOK determined to overlap. Phase two analyzed the remaining topics, those with a presence indicated by 1, for their ability to meet *computing applications and other advanced technology* a LAAB curriculum accreditation requirement. An example of phase two can be seen in Figure 4.5. Completed results can be found in appendix H.

			LABOK		mmand of	LAAB							GIS& alytica						_	_
				Knowle	mmand of dge at time of Degree	and other	А	M1	AM	<b>/</b> 12		- 111	-	АМЗ	1000			Al	И4	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications are advanced technologous	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	1	0	0	0	0	1	0	1	1	1	1	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	1	0	0	0	0	0	0	0	1	1	0	1	-1
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	1	0	0	0	0	0	0	0	1	0	1	0	1	0
	and wethodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	1	0	0	0	0	1	0	0	1	0	1	0	0	0
Knowledge		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Statements		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	1	0	1	0	-1	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	0	0	1	0	1	0	0	0	0	1	0	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	1	0	1	0	1	0	1	0	1	1
	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	1	0	0	0	1	1	1	0	0	0
	Various Scales	26	conservation of natural resources	2.33	0.8	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1
	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		29	Water resource management	1.91	0.84	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1

Figure 4.5 An example of completed phase two results. The grey column identifies LABOK Knowledge Statements and Competencies are capable of achieving *computing applications* and other advanced technology as a LAAB curriculum accreditation requirement.

Identifying Knowledge Statements and Competencies that fall into the LAAB domain of computing applications and other advanced technology determined possible curriculum integration points for incorporating GIScience while achieving LAAB curriculum accreditation. Phase one determined ninety-one LABOK Knowledge Statements and Competencies overlapped GIS&T BOK topics. Of the ninety-one Knowledge Statements and Competencies, forty-nine were found to incorporate computing applications and other advanced technology. Of the Forty-nine LABOK Knowledge Statements and Competencies thirty-two contained a mean of 2.00 (LABOK) or greater. Seventeen Knowledge Statements/Competencies had a mean between 1.00 (LABOK) and 2.00 (LABOK), and zero had a mean below 1.00 (LABOK). Thirty-three of the forty-nine Knowledge Statements and Competencies overlapped with ten or more GIS&T BOK topics. Of all LABOK Knowledge Statements and Competencies containing ten or more overlaps

only three were found not to fall into the domain of *computing applications and other advanced technology*. Those three topics were Wetland with fourteen overlaps, History of Landscape Architecture and allied professions with fourteen overlaps, and Aesthetic principles of design fourteen overlaps. Results established the LABOK Knowledge Statements and Competencies with the strongest relationships to GIS&T BOK topics are also those most capable of achieving the LAAB curriculum accreditation requirement *computing applications and other advanced technology*.

Of the 170 GIS&T topics determined to have a relationship with LABOK Knowledge Statements and Competencies, 154 were related to the forty-nine Knowledge Statements and Competencies identified in phase two. These 154 GIS&T topics covered each of the ten GIS&T BOK Knowledge Areas implying a broad spectrum of GIScience and Technology topics are beneficial to a first professional landscape architecture degree. Of the 887 relationships determined between the LABOK and GIS&T BOK, 717 were contained within the forty-nine LABOK Knowledge Statements and Competencies focused on in phase two. The other 170 matrix overlaps were distributed among the sixty-one LABOK Knowledge Statements and Competencies eliminated in phase two.

The GIS&T BOK topics remaining in phase two covered eight of the original LABOK Knowledge Statements and six of the eight Competency domains. The only LABOK domain without a Knowledge Statement in phase two was Landscape Architecture History and Criticism. Two LABOK Competency domains were without Competencies in phase two 1) Landscape Architecture History and Criticism and 2) Values and Ethics in Practice. Phase two results showed highest valued Knowledge Statements and Competencies of a first professional degree were capable of utilizing GIScience to achieve LAAB curriculum accreditation in both computing applications and other advanced technology and a second LAAB curriculum accreditation requirement from the Knowledge Statements/Competencies.

### Phase Three: evaluating the Kansas State University Tech Module sequence

Phase three used results from previous phases along with objectives from the six Kansas State University Tech Module courses to evaluate incorporation of GIScience and Technology in the first professional degree program at Kansas State University. Table 4.2 provides an example of Tech Module objectives. A complete listing of Tech module objectives can be found in Appendix C.

Tech Module	Objective
I	6. To introduce and utilize GIScience data, technology, applications and methods—including GIS (ESRI ArcGIS), Thematic Mapping, and Remote Sensing—to create a developable land summary map at a variety of scales and 3D Fly Through of a landscape.
II	To learn effective coalescence and implementation of digital tools used to communicate existing and proposed landscape features for site scale landscape projects.
IV	7. To introduce the basic elements of landscape surveying including terms and methods for measurement systems, profile leveling, topographic and site surveying.

Table 4.2 An example of objectives from Tech Module course syllabi. The left column refers to the course. The right column refers to the objective of that course.

The evaluation queried LABOK Knowledge Statements and Competencies, GIS&T BOK topics, and course syllabi objectives. The final phase determined the extent of GIScience and Technology integration in the Tech Module courses which are the curriculum foundation for teaching computer applications and technology.

	X-		LABOK	A		LAAB							# Tech Module
Knowledge Statement /	Approximation			Knowle	mmand of dge at time of Degree	uter ns and ranced logy		т	ECH MC	DULE			Courses with Objectives Incorporating LABOK
Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computer applications and other advanced technology	1	п	Ш	IV	v	VI	Accreditation Knowledge Statements or Competencies
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0
	Natural and	4		2.43	0.76	1	2,3,4,6	2,3,4,6	2	2,3,4	2	4	6
	Cultural Systems	5		2.76	0.66	1	2,4	2,4,5	2	2,4,5	2	1	6
	Cultural Systems		social and cultural influences on design	2.19	0.81	1	3	0	0	0	2	0	2
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	1	1,5	1,5	2	1,5	2	0	5
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	2,3,4	2,3,4	0	2,3,4	2	4	5
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	5	5	2	5	2	0	5
	Planning Theories and Methodologies		relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	2,4,5	2,4,5	0	2,4,5	2	1	5
	and iviethodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	4,5	4,5	2	4,5	2	0	5
Knowledge		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	5	5	0	5	0	1	4
Statements		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1,2,3	1,2,3,4	1	1,2,3,4	1	4	6
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	4	4	0	4	2	0	4
		21	photogrammetry and remote sensing	1.47	0.84	1	3,5	3,4,6,8	1	3,4,7	1	1	6
	No 1 100 2 100 2		visual resource assessment	1.91	0.88	1	1,4,5	1,3,5,8	1,3	1,3,5,7	1	1,4	6
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	5	5	0	5	1	0	4
	and	24	urban landscape	2.17	0.71	1	0	4	2	4	2	0	4
	Management at	25		2.12	0.76	1	0	4	0	4	2	0	3
	Various Scales	26		2.33	0.8	1	0	6	0	0	0	0	1
	and Applications	28	ecological planning principles	2.23	0.8	1	0	6	2	0	0	0	2
		29	Water resource management	1.91	0.84	1	0	6	2	0	0	0	2
		31	floodplain management	1.8	0.86	1	0	6	0	0	0	0	1

Figure 4.6 An example of phase three results.

This phase identified strengths and weaknesses of the Tech Module sequence, pertaining to GIScience. Completed results of phase three can be found in Appendix I. The evaluation only used the forty-nine LABOK Knowledge Statements and Competencies found to relate to the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. As noted in the previous section, upon completion of a first professional degree a student should have at least exposure if not comprehension of each Knowledge Statement and Competency.

Based on objectives for the six courses in the Tech Module sequence, only three Knowledge Statements and one Competency identified in phase two were not incorporated into at least one course. They are 1) Land information sources, 2) Regional hazard design considerations, 3) Roadway design principles, and 4) Maintain clear communication among collaborators through correspondence and project coordination. Many Knowledge Statements and Competencies appeared in multiple courses. Eight LABOK Knowledge Statements and One LABOK Competency were met in all six Tech Module courses. Five LABOK Knowledge Statements were incorporated in five Tech Module courses. Four Knowledge Statements and two Competencies were incorporated into four courses. Nine Competencies and two Knowledge statements were found in three courses. Five Knowledge Statements and two Competencies appeared in two courses. Five Knowledge Statements and one Competency appeared in one Tech Module based on objectives.

Many Knowledge Statements and Competencies were covered by multiple objectives for a single Tech Module course. Tech Module courses I, II, and IV exhibited the strongest relationship to GIScience. Based on course objectives these courses best incorporated LABOK Knowledge Statements and Competencies. These courses had seven to eight objectives. Tech Modules III and V had fewer objectives and therefore have less opportunity for objectives to apply to LABOK Knowledge Statements and Competencies. At the time of this study the Tech Module VI course had not been taught and objectives were based on proposed learning objectives.

Based on information provided in the Tech Module syllabi it is not known how GIScience and Technology is incorporated. Material covered in the courses varies each semester due to integration with parallel course projects which provides new opportunities for utilizing GIScience and Technology each time a course is taught. Using GIS&T BOK topics identified in phase one, the Kansas State program can assess how the tech module sequence can employ GIScience and Technology to meet Tech Module objectives in a manner that helps achieve LAAB curriculum accreditation.

In summary, this study identified 887 overlaps between 91 (of the 110) LABOK Knowledge Statements / Competencies and 170 (of 329) topics of the GIS&T BOK. Of the 887 overlaps between the BOK's, 717 were contained in forty-nine Knowledge Statements / Competencies that met the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. The findings of this study indicate the domains of the LABOK study found to contain relationships to the GIS&T BOK and also where these overlaps can be used to help achieve LAAB curriculum accreditation. Results provide a basis for the assessment and integration of GIScience and Technology in first professional degree landscape architecture programs. Using Phase 1 and 2 results of this study, the Kansas State University Tech Module sequence of courses were evaluated in a case study which identified strengths and weaknesses of the use of GIScience and Technology.

## **Chapter 5 - Conclusions**

Phase one of the study answered research question one: Where are there intersections or overlap relationships between the LABOK and GIS&T BOK defined Knowledge Areas based on literature supporting the use of GIScience for landscape architects and descriptions of Knowledge Areas found in LABOK and GIS&T BOK? Literature review indicated a relationship between the two Bodies of Knowledge and Phase one identified 887 relationships between topics of the GIS&T BOK and LABOK Knowledge Statements and Competencies. The strength of the relationship between GIS&T and LABOK was demonstrated with relationships established in each of the ten GIS&T BOK Knowledge Areas, and each LABOK Knowledge Statement and Competency domain. The relationships established in this study between the two bodies of knowledge illustrate the breadth of connections between GIS&T and a first professional degree in landscape architecture.

The second research question asked: Which of the LABOK Knowledge Statements and Competencies found to contain overlaps with the GIS&T BOK achieve LAAB accreditation standards particularly dealing with computer applications and technology? Phase two established that GIS&T BOK topics can be used to help meet LAAB curriculum requirements particularly the domain *computing applications and other advanced technology*. Forty-nine of the ninety-one LABOK Knowledge Statements, with an established relationship to GIS&T, were found capable of meeting the LAAB curriculum requirement *computing applications and other advanced technology*.

Achieving LAAB curriculum standards is essential to any institution offering a first professional degree. Incorporating the GIS&T BOK topics identified in this study in a first professional landscape architecture curriculum as problem solving methods and tools can help meet at least the LAAB requirement of *computing applications and other advanced technology*. Great potential exists to achieve additional curriculum requirements and LAAB standards especially in programs that integrate parallel courses with technology courses as is the case at Kansas State. Results of phase two can be used for the evaluation of use or incorporation of GIS&T in a first professional degree program to help achieve LAAB curriculum accreditation as illustrated in Phase 3 of this study.

Phase three provided an evaluation of the integration of GIS&T in the first professional degree landscape architecture program at Kansas State University. The program's six course Tech Module sequence aims to teach technologies appropriate to spatial temporal problem solving requirements in parallel studio and construction courses. The Tech Module courses are designed to enforce and supplement material from corresponding courses while incorporating technological theories and methods. Research question three sought to answer if the Kansas State University first professional degree landscape architecture program was appropriately integrating GIS&T as a problem solving tool based on LABOK, GIS&T BOK, LAAB standards and literature regarding GIScience in landscape architectural problem solving.

Based on the Tech Module syllabi the Kansas State program incorporates GIScience into the curriculum. Comparing Tech Module course objectives with phase two results revealed many strengths and a few weaknesses in integration of GIScience and Technology. Forty-five of the forty-nine Knowledge Statements and Competencies from phase two were incorporated into the Tech Module courses. The Knowledge Statements and Competencies that were not present are1) Land information sources, 2) Regional hazard design considerations, 3) Roadway design principles, and 4) Maintain clear communication among collaborators through correspondence and project coordination. These are areas Kansas State University can improve integration of GIS&T in the current Tech Module sequence. The Kansas State University first degree program should incorporate principles of the four Knowledge Statements and Competencies into learning objectives using the GIS&T BOK topics to refine assessment measures. Nine LABOK Knowledge Statements/Competencies were exhibited in objectives of all six tech module courses (listed):

- 1. Patterns of Land use and built form
- 2. Natural site conditions and ecosystems
- 3. Communication and education methods, including sharing knowledge and evaluating outcomes
- 4. Photogrammetry and remote sensing
- 5. Visual resource assessment
- 6. Geographic coordinate systems and layout techniques and conventions
- 7. The roles of visual communication including photographic and video documentation
- 8. Graphic presentation techniques, systems and symbols

9. Create graphic materials in a variety of media

Each of the nine Knowledge Statements and Competencies relate directly to or utilize a fundamental GIS&T component. The Kansas State University Tech Module sequence displayed a strong incorporation of GIScience and Technology based on course objectives.

Results of this study provide evidence of a relationship between GIS&T and landscape architecture. The connections between GIS&T and landscape architecture represent problem solving methods and tools for a landscape architect. Approaching landscape architectural problems with the aid of GIS&T provides the opportunity for making more informed spatial temporal decisions, speaks to LABOK knowledge and competency areas and meets LAAB accreditation standards. Incorporating GIS&T into landscape architectural problem solving also presents a means of assessment and presentation of materials. The GIS&T BOK topics provide additional detailed text capable of informing how and what should be assessed when dealing with a spatial temporal problem and relevant learning objectives for defined problems in parallel and Tech Module courses.

Results established 887 relationships between the GIS&T BOK and the LABOK. These relationships provide the basis for utilizing GIS&T in landscape architecture. Each GIS&T BOK topic that overlapped with LABOK Knowledge Statements and Competencies contains objectives for achieving understanding of the topic. The objectives for GIS&T BOK topics provide a guide for content and assessment required for understanding of each GIS&T BOK topic included in learning objectives and defined spatial temporal problems. Incorporating these objectives into landscape architecture curricula not only integrates GIS&T, but also provides alternative methods and tools to approaching problem solving. Individuals can use GIS&T BOK topic objectives to incorporate GIS&T as a problem solving tool or as an assessment tool for existing use of GIS&T. Landscape Architecture programs can use results to incorporate GIS&T or evaluate existing use of GIS&T in a first degree program.

#### **Limitations and Future Research**

The study was limited by the lack of detail in the LABOK Study. The LABOK study contains only a list of Knowledge Statements and Competencies a landscape architect should be knowledgeable of. The LABOK presents no objectives on how to achieve understanding of the Knowledge Statements and Competencies. A clear outline on how to comprehend LABOK

Knowledge Statements and Competencies would allow a more in depth comparison with the objectives laid out for GIS&T topics.

A second limitation of the study exists in the initial matrix. The initial matrix was used to determine the presence and absence of overlaps between the LABOK and GIS&T BOK. The matrix was populated using a binary coding system to determine presence or absence of overlap between categories of the respective bodies of knowledge. While the binary system served the purpose of identifying overlaps, it minimized the ability to run statistical models on results and identify correlations beyond the count and visual analysis presented here.

A third limitation exists in this study as the results are based on a single observer and the author anticipates varying results depending on educational background and experience of others using the same methods especially given the fact the author completed all necessary courses for a first professional graduate degree in Landscape Architecture and a Graduate Certificate in GIS both at Kansas State University while conducting this study.

Future research could involve multiple participants in a survey approach to overlap delineation to remove bias and creating a database capable of storing and querying relationships to quickly find appropriate GIS&T topic detailed text useful in curricula and course planning, design and assessment. A searchable database would also provide a more efficient manner of storing matrix data and allow retrieval of queried information much faster. A second opportunity for future reseach would be to devise a more descriptive coding system for populating the matrix. A scaled or weighted system could incorporate relationship significance to identify strength of relationship between the LABOK and GIS&T BOK categories and allow for experimental design options for different types of analysis. Additional research questions could consider how GIScience and Technology topics are being integrated into first professional degree programs in many programs for comparative analysis, whether learning objectives of other LAAB accredited first professional degree programs utilize GIScience and Technology, and how GIScience and Technology topic integration could aid first professional landscape architects in achieving both landscape architectural and Geographic Information Science professional credentials.

In conclusion, landscape architecture is a profession that reflects natural, social, and cultural systems and the relationships between those systems and Geographic Information Science and Technology are integral in understanding and solving such spatial temporal dilemmas. As hypothesized, significant overlaps exist between the LABOK and GIS&T BOK

studies relevant to professional landscape architecture problem solving and essential to training landscape architects in professional degree programs. This study identifies critical relationships between the LABOK and GIS&T BOK, and the detailed topic text of the GIS&T overlapping categories can truly benefit the development of curricula, courses and assignments which provide essential methods and tools for understanding complex spatial temporal phenomena in natural and human systems studied and designed by landscape architects.

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## **Appendix A - LABOK Knowledge Statements and Competencies**

#### **Knowledge Statements**

#### **Landscape Architecture History and Criticism**

- 1 history of landscape architecture and allied professions
- 2 historic preservation principles

#### **Natural and Cultural Systems**

- 3 land information sources
- 4 patterns of land use and built form
- 5 natural site conditions and ecosystems
- 6 social and cultural influences on design
- 7 regional hazard design considerations

#### **Design and Planning Theories and Methodologies**

- 8 creativity and process including design theory and problem -solving strategies
- 9 aesthetic principles of design
  - human factors such as behavior, perception, psychological and sensory
- 10 response
- 11 natural factors such as ecological relationships relationship between human and natural systems such as resource
- 12 conservation, habitat restoration and creation, and urban ecology
- 13 influence of context on design, planning, and management decisions research methods including data collection, interpretation, and application of
- 14 results
- 15 therapeutic aspects of design communication and education methods, including sharing knowledge and
- 16 evaluating outcomes

#### **Public Policy and Regulation**

- 17 governmental policies and laws that affect the use and development of land
- 18 political and regulatory approval processes
- 19 land and development economics
- 20 emerging trends and issues

#### Design, Planning and Management at Various Scales and Applications

- 21 photogrammetry and remote sensing
- 22 visual resource assessment
- 23 agricultural and rural landscape analysis
- 24 urban landscape
- 25 planning principles including regional community and neighborhood planning
- 26 conservation of natural resources
- 27 historic preservation
- 28 ecological planning principles
- 29 Water resource management
- 30 wetland
- 31 floodplain management land and water reclamation procedures including quarry, mine and landfill
- 32 reclamation
- 33 treatment of toxic materials

# Site Design and Engineering: Materials, Methods, Technologies and Applications

- 34 design needs for special populations
- 35 accessibility regulations
- 36 roadway design principles elements of vehicular and pedestrian circulation systems and their design
- 37 requirements
- 38 landscape maintenance techniques, materials, equipment, and practices
- 39 noise attenuation and mitigation techniques
- 40 sustainable construction practices
- 41 construction equipment and technologies
- 42 grading, drainage and stormwater treatment
- 43 biofiltration and other alternative drainage methods
- 44 erosion and sedimentation control
- 45 utility systems
- 46 Irrigation systems
- 47 lighting systems
- 48 structural considerations

#### **Construction Documentation and Administration**

quality control procedures for construction, such as delivery, storage, testing,

- 49 etc.
- 50 sequencing of design, approval, permitting, and construction activities
- 51 the life-cycle cost-analysis process
- 52 geographic coordinate systems and layout techniques and conventions
- 53 specification types and components for a project general and supplemental conditions, special provisions, and technical
- 54 specifications and their organizations
- 55 construction administration and details
- 56 basic construction law
- 57 construction contracts

#### Communication

- 58 determination of user values such as focus groups and surveys
- 59 consensus and team building
- 60 techniques for conducting meetings the roles of visual communication, including photographic and video
- 61 documentation
- 62 graphic presentation techniques, systems and symbols interpretive methods and techniques such as information displays and
- 63 brochures
- 64 public relations, outreach, and image development

#### **Values and Ethics in Practice**

- 65 environmental ethics
- 66 social responsibility in design organizational management principles such as leadership principles and
- 67 landscape architect career cycle
- 68 resolving moral and ethical dilemmas

#### **Competencies**

#### **Landscape Architecture History & Criticism**

Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and

- 69 architecture
  - Examine economic, political, social, ecological and esthetic relationships and
- 70 their influence on the development of the profession of landscape architecture Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature,
- 71 personalities, and concepts
  - Demonstrate the ability to critique prior work and understand the relevance in
- 72 addressing current issues and problems
  - Develop an ability to synthesize and make connections between aspects of
- 73 landscape architecture and disciplines outside of landscape architecture Conduct field investigations to identify significant natural and cultural features,
- 74 characteristics, and systems
  - Perform quantitative analyses to evaluate the interactions of natural and
- 75 cultural features, characteristics, and systems
  - Perform qualitative analyses to evaluate the relationship between the natural
- 76 and cultural features, characteristics, and systems
  - Predict implications of design, planning, and management proposals on
- 77 natural cultural systems both within the site and in the larger context

#### **Public Policy and Regulation**

- Identify and collect regulatory information, applicable data and required
- 78 approvals governing a project (e.g., relevant laws, codes, and regulations)
- 79 Confirm code compliance (e.g. zoning, environment, and accessibility)
  Assist in the preparation of ordinances, regulations, covenants, standards,
- 80 and guidelines
  - Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public
- 81 distribution

#### Design, Planning, and Management at Various Scales and Applications

Develop a design program based on users' needs and clients' goals and

- 82 resources
  - Analyze relationships among design elements by determining opportunities
- 83 and constraints
- 84 Develop conceptual design, planning, and management solutions
- 85 Evaluate design alternatives to determine the appropriate solution

# Site Design and Engineering: Materials, Methods, Technologies and Applications

- Design for protection and management of land resources (e.g. land forms,
- 86 vegetation, habitat, erosion and sedimentation control)
  - Design for protection and management of water resources (e.g. storm water,
- 87 water supply, ground water)
- 88 Design pedestrian, vehicular, and non-motorized circulation systems
  - Design elements for construction considering materials, structural issues, and
- 89 construction technologies

#### **Construction Documentation and Administration**

- Prepare construction documents including plans, working drawings, and 90 technical specifications
- Prepare contract documents including agreements, general conditions, and 91 bid documents

- 92 Manage the bidding/tendering process
- 93 Provide construction administration and observation throughout the project Conduct project closure including review and distribution of close-out
- 94 documents
- 95 Perform post construction evaluation
- 96 Perform construction services including design-build
- 97 Prepare management and maintenance manuals and documents

#### Communication

Maintain clear communication among collaborators through correspondence

- 98 and project coordination
  - Develop written documentation, such as projects reports, grant proposals, and
- 99 promotional materials
- 100 Create graphic materials in a variety of media

Prepare and deliver oral presentations such as meetings, demonstrations, and

101 outreach

Conduct project and public meetings including preparing of meeting agendas

- 102 and notes, and facilitation of the meeting
- 103 Review and critique peer work

#### **Values and Ethics in Practice**

- 104 Manage business practices and organizations
- 105 Manage risk and liability
- 106 Negotiate and prepare client and consultant agreements

Participate in life-long learning (e.g., a professional organization, continuing

- 107 education activities)
- 108 Participate in professional and public service activities
- 109 Train, educate and mentor other professionals
- 110 Maintain and promote professional and ethical standards

# Appendix B - GIS&T BOK Knowledge Areas, Units, Topics

AM1 - Academic and analytical origins Analytical Approaches Analytical Approaches AM2 - Query operations and query language Set Theory Structured Query & Language Schall Samping for Statistical Analysis Principles of Semi-variogram Construction Spatial Queries Schall Queries AM2 - Query operations and query language Schall Approaches AM3 - Page operations Schall Queries AM4 - Basic analytical measures AM4 - Sacra analytical operations Buffers AM4 - Basic analytical operations Buffers AM5 - Basic analytical perations AM6 - Basic analytical methods Point Pattern Analysis Point Queries AM5 - Basic analytical methods Point Pattern Analysis Point Queries AM6 - Analysis Point Queries AM6 - Analysis AM6 - Analysis Point Queries AM6 - Analysis AM6 - Sacra analytical methods Point Pattern Analysis Spatial Infrareis Point Queries AM6 - Analysis Spatial Process Modeling AM6 - Analysis AM6 - Analysis AM6 - Analysis Spatial Process Modeling AM6 - Analysis Spatial Process Modeling AM6 - Analysis Spatial Process Spatial Process Modeling AM6 - Analysis Spatial Processes Spatial Proc
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## **Appendix C - Tech Module Objectives that incorporate GIScience**

Below are the objectives used in phase three. The objectives are taken directly from the Kansas State University LA Tech Module course syllabi (LAR 510, LAR 520...LAR 560). Objectives were used to evaluate the use of GIScience in the Kansas State University Tech Module sequence. Only objectives with a direct reference to GIScience or ideals of GIScience and Technology exhibited in relevant literature are included.

#### Tech Module 1 (LAR 510)

- To create a learning community focused on landscape architectural problem solving and communication using digital tools including 3D Visualization, Geographic Information Systems (GIS), Graphics and Office Software and image capturing hardware, and possibly Computer Aided Drafting and Design (CADD).
- 2. To understand that design and the built environment are products of a process of communication.
- 3. To understand that professional landscape architects communicate in a variety of forms—verbal, written, and graphic—via digital media.
- 4. To learn effective coalescence and implementation of digital tools used to communicate existing landscape conditions and design alternatives via a real world project.
- 5. To learn foundational knowledge, skills and abilities related to digital landscape architectural problem solving including: digital theories, methods and standards used to organize, inventory, analyze, synthesize, create, and communicate design information.
- 6. To introduce and utilize GIScience data, technology, applications and methods—including GIS (ESRI ArcGIS 9.1), Thematic Mapping, and Remote Sensing—to create a developable land summary map at a variety of scales and 3D Fly Through of a landscape.

#### Tech Module 2 (LAR 520)

- 1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including 3D Visualization, Geographic Information Systems (GIS), CADD, Image and Graphics and Office Software and image capturing hardware.
- 2. To build upon understanding that design and the built environment are products of a process of communication.
- 3. To further development of professional landscape architects communication knowledge, skills and abilities in a variety of forms—verbal, written, and graphic—via digital media.
- 4. To learn effective coalescence and implementation of digital tools used to communicate existing and proposed landscape features for site scale landscape projects.
- 5. To learn foundational knowledge, skills and abilities related to digital landscape architectural problem solving including: digital theories, methods and standards used to organize, inventory, analyze, synthesize, create, and communicate design information.
- 6. To build upon prior learning and utilize GIScience data, technology, applications and methods—including GIS (ESRI ArcGIS 9.x), Thematic Mapping, and Remote Sensing—to create a developable land summary map at a variety of scales and 3D Fly Through of a landscape.
- 7. To introduce and utilize AutoDesk Land Desktop 2007 (including AutoCAD 2007) and the National CAD Standard to create and develop existing and proposed landscape features and details and coalesce AutoCAD drawings (.dwg) with GIS and SketchUp applications to enhance digital modeling efficiency and communication options.
- 8. To introduce the basic elements of landscape surveying including terms and methods for measurement systems, profile leveling, topographic and site surveying.

#### Tech Module 3 LAR (530)

- To create a learning community focused on landscape architectural problem solving and communication using digital tools including: 3D Modeling & Visualization, Geographic Information Systems (GIS), Graphics and Office Software, image capturing hardware, and Computer Aided Drafting and Design (CADD).
- To apply and enhance understanding of effective coalescence and implementation of digital tools used to communicate existing and proposed landscape elements, and construction document survey of existing conditions (base maps), grading plans, planting plans, and earthwork estimates.
- 3. Gain knowledge and experience in site surveying methods, equipment and processes used by surveyors to develop site surveys for landscape architects.

#### Tech Module 4 LAR (540)

- 1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including 3D Visualization, Geographic Information Systems (GIS), CADD, Image and Graphics and Office Software and image capturing hardware.
- To build upon understanding that design and the built environment are products of a process of communication.
- 3. To further development of professional landscape architects communication knowledge, skills and abilities in a variety of forms—verbal, written, and graphic—via digital media.
- 4. To learn effective coalescence and implementation of digital tools used to communicate proposed landscape features for site scale landscape.
- 5. To learn foundational knowledge, skills and abilities related to digital landscape architectural problem solving including: digital theories, methods and standards used to organize, inventory, analyze, synthesize, create, and communicate design information.
- 6. To introduce and utilize AutoDesk Land Desktop 2007 (including AutoCAD 2007) and the National CAD Standard to create and develop existing and proposed landscape features and details and coalesce AutoCAD drawings (.dwg) with GIS and SketchUp applications to enhance digital modeling efficiency and communication options.
- 7. To introduce the basic elements of landscape surveying including terms and methods for measurement systems, profile leveling, topographic and site surveying.

#### Tech Module 5 (LAR 550)

- 1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including: 3D Modeling & Visualization, Geographic Information Systems (GIS), Graphics and Office Software, image capturing hardware, and Computer Aided Drafting and Design (CADD).
- 2. To apply advanced understanding of effective coalescence and implementation of digital tools used to communicate existing and proposed landscape elements in 2D and 3D, and construction documents for a mixed use development.

#### Tech Module 6 (LAR 560)

- 1. Site Data Collection & Implementation- GPS, Laser, Level (1)
- 2. Spreadsheets & Database Tables, Templates, Data Query & Reporting
- 3. Thematic Mapping & Geoprocessing-GIS
- 4. Digital Documents, Imaging, Graphics & Presentation

## **Appendix D - Creating a Matrix Image**

Microsoft Excel 2003 lacked the capability to include the necessary number of columns required for the phase one matrix in one worksheet. To view the matrix as a whole, the results had to be merged using an alternative software program. The following instructions illustrate the process used to merge results using ESRI's ARCmap GIS software.

Results (1's and 0's) of the phase 1a matrix were transferred into ten new excel worksheets using the first phase format of one worksheet for each of the ten GIS&T Knowledge Areas. Each worksheet was then named with the Knowledge Area initials and saved as a .txt file with ANSI coding . In Notepad the following information was inserted into the top of the document.

ncols 0
nrows 110
xllcorner 0
yllcorner 0
cellsize 1

nodata value -9999

This information provided geospatial reference in ARCmap. Only the <u>ncols</u> and <u>xllcorner</u> information required modification. The <u>ncols</u> represented the number of columns. In Notepad the <u>ncols</u> (0) was replace with the appropriate number of columns for each Knowledge Area. For example the Data Manipulation (DN) Knowledge Area contained 14 columns (<u>ncols</u> 14). The <u>xllcorner</u> provided the data insertion point. The first Knowledge Area <u>xllcorner</u> remained at zero. Subsequent Knowledge Areas contained cumulative number of rows For example the first Knowledge Area contained 59 columns therefore the second <u>xllcorner</u> had a number of 59, the second Knowledge Area contained 30 columns therefore the third document had an <u>xllcorner</u> of 89 (59+30). The xllcorner was modified for each Knowledge Area based on this formula. Once modified to include spatial referencing information the documents were moved to ESRI's ArcCatalog. The ASCII to raster conversion tool in Arc Toolbox was used for creating the raster images. In the conversion tool, the .txt files were chosen as the input, and the data type was set to float. Each .txt file was converted in the same manner. Once each file was converted, in the data

management tools the raster option was selected and the target raster was chosen as the first Knowledge Area AM. The remaining Knowledge Area files were placed in the input. A new raster image is created as a modified version of the AM raster. This image contained all results of the phase 1a matrix. A completed version containing the appropriate headings can be found in the following image.

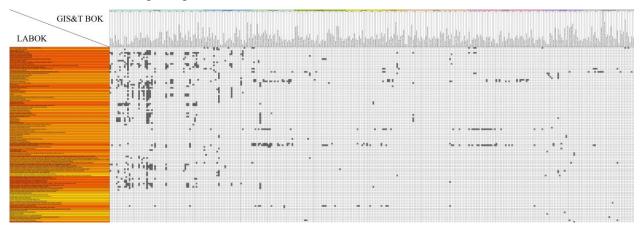


Figure A.1 The initial matrix with all 10 Knowledge Areas merged together into one document.

# **Appendix E - The Initial Matrix (1a)**

			LABOK														S&T E											
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					dge at time of Degree	ΑI	M1		AM2				1	AM3				ΑN	Л4					F	AM5			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	1	0	1	1	1	0	0	1
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	1	1
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1
0.7.1.2.1.1.0	and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	1	0	0	1
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Regulation	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	regulation	19		1.47	0.83	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
		21	photogrammetry and remote sensing	1.47	0.84	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
		24	urban landscape	2.17	0.71	0	0	0	0	0	1	0	1	0	1	0	1	0	1	1	1	0	0	1	0	0	0	1
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0
	and	26	conservation of natural resources	2.33	0.8	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0
			historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28		2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0
	and Applications		Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
STATEMENTS	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	42		2.78	0.57	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	1	1	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
		47	0 0 7	1.7	0.79	0	0	0	0	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
		48	structural considerations quality control procedures for construction, such as delivery,	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		49	storage, testing, etc. sequencing of design, approval, permitting, and construction	1.27	0.87	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		50	activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Comptimization	51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration		general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			construction administration and details	1.73	0.92	0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			basic construction law	1.48	0.84	0		0	0	0	0		0	0	0	0	0	0	0	0	0	_	0	0	0	0	0	
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings the roles of visual communication, including photographic and	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
	Communication	61	video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
KNOW! EDGE		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	67	social responsibility in design organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
	Landscape	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0
COMPETENCIES	Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
			Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0

Natural & Cultural Systems   76   Conduct field investigations to identify significant natural 2								do		S&T B											mmand of	Com	LABOK			
Minimal Regulation   Profession   Professi		AM5								licai iv	Arialy		AM3	Δ				AM2		4M1	dge at time of	Knowled				
Natural & Cultural Systems  Natural & Cultural Systems  Natural & Cultural Systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Perform qualitative analyses to evaluate the relationship characteristics, and systems  Provide implications of design, planning, and  77 management proposals on natural actural systems both 1.88 0.76 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	pc uo 4	Analyzing Multidimensional Attributes		Spatial Cluster Analysis	Kernels & Density Estimation	Point Pattern Analysis	Map Algebra			Buffers		Proximity & Distance Decay			Direction	Distance & Lengths	Spatial Queries		Set Theory	Analytical Approaches	1		Knowledge Statements / Competencies		Domains	Statement / Competency
Natural & Cultural Systems   Syste	0 0 0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0.74 1	2.06				
Competencies   Comp	0 0 1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.78 0	1.64	teractions of natural and cultural features, naracteristics, and systems	75 <mark>ir</mark> c	Natural & Cultural	
Transagement proposals on natural cultural systems both 1.88   0.76   0   0   0   0   0   0   0   0   0	0 0 1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.78 0	1.79	etween the natural and cultural features, naracteristics, and systems	76 <mark>b</mark>		
Public Policy and Regulation  Public Policy and Regulation  Regula	0 0 0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.76 0	1.88	anagement proposals on natural cultural systems both ithin the site and in the larger context	77 <mark>m</mark> W		
Public Policy and Regulation   Public Policy and Regulation   Regula	0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.74 1	1.31	quired approvals governing a project (e.g., relevant laws, odes, and regulations)	78 <mark>re</mark>		
COMPETENCIES    Some contents is standards, and guidelines   0.77   0.69   0   0   0   0   0   0   0   0   0	0 0 0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0.81 0	1.37	nd accessibility)	79 <mark>a</mark>	Public Policy and	
Stite Design and Engineering: Materials, Methods, Technologies Methods, Technologies Methods, Technologies Methods, Technologies Root Root Root Root Root Root Root Roo	0 0 0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.69 0	0.77	venants, standards, and guidelines	80 0	Regulation	
Design, Planning, and Management at Various Scales and Applications   Applications   Site Design and Engineering: Materials, Methods, Technologies   Techn	0 0 0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.75 0	0.73	nd water management by testifying, lobbying, or preparing ritten documents for public distribution	81 <mark>a</mark> w		
COMPETENCIES   And Management at Various Scales and Applications   S	0 0 0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0.75 0	2.13	pals and resources	82 g		
COMPETENCIES   and Applications   84   Develop Contestical design, planning, and management   2.39   0.61   0   0   0   0   0   0   0   0   0	0 0 0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0.62 0	2.33	portunities and constraints	83	and Management	
Site Design and Engineering: Materials, Methods, Technologies   Technologies   Sexious and testing a	0 0 0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.61 0	2.39	plutions	84 S	and	COMPETENCIES
Site Design and Engineering: Materials, Methods, Technologies  86 (e.g. land forms, vegetation, habitat, erosion and sedimentation control)  2.13 0.64 0 0 0 0 1 0 0 0 0 0 1 1 1 0 0 1 0 0 0 1 1 1 1 0 0 1 0 0 0 1	0 0 0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0.59 0	2.45	ppropriate solution	85 a		
Engineering: Materials, Methods, Technologies  87 Design for protection and management of water resources (e.g. storm water, water supply, ground water)  88 Design for protection and management of water resources (e.g. storm water, water supply, ground water)  88 Design for protection and management of water resources (e.g. storm water, water supply, ground water)  88 Design for protection and management of water resources (e.g. storm water, water supply, ground water)  88 Design pedestrian, vehicular, and non-motorized (e.g. storm water, water supply, ground water)  88 Design pedestrian, vehicular, and non-motorized (e.g. storm water, water supply, ground water)  88 Design pedestrian, vehicular, and non-motorized (e.g. storm water, water supply, ground water)	0 0 1	0	1	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	0	0	0.64 0	2.13	.g. land forms, vegetation, habitat, erosion and	86 (6		
Technologies   88   Design pedestrian, venicular, and non-motorized   2.28   0.62   0   0   0   0   0   1   1   0   0   1   0   1   0   0	0 0 0	0	1	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0		0.66 0	2.05	.g. storm water, water supply, ground water)	(6	Engineering: Materials,	
anu Applications	0 0 0	0	0	0	0	0	1	0	1	0	1	1	0	0	1	1	0	0	0	0	0.62 0	2.28				
89 Design elements for construction considering materials, structural issues, and construction technologies  1.94 0.69 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.69 0	1.94	ructural issues, and construction technologies	st		
90 Fregate construction documents including pairs, working 1.87 0.77 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.77 0	1.87	awings, and technical specifications	90 <mark>d</mark>	_	
91 conditions, and bid documents 1.24 0.82 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0																						onditions, and bid documents	91 0	I	
Construction Documentation 99 Manage the bidding/tendering process 0.72 0.7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0																						ovide construction administration and observation	O2 P	Construction	
and Administration 94 Conduct project closure including review and distribution of close-out documents 0.67 0.73 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.73 0	0.67	onduct project closure including review and distribution of	OA C	and	
95 Perform post construction evaluation 0.91 0.79 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0								_											_			erform post construction evaluation	95 <mark>P</mark>		
96 Perform construction services including design-build 0.67 0.7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0																						repare management and maintenance manuals and	97 P	I	

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0014055510150			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice		Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
	III FIACIICE	108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	9	8	0	1	8	17	13	9	3	20	15	33	17	4	17	2	0	2	27	5	6	13	
					Average	0.08	0.07	0.00	0.01	0.07	0.15	0.12	0.08	0.03	0.18	0.14	0.30	0.15	0.04	0.15	0.02	0.00	0.02	0.25	0.05	0.05	0.12	.10.0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Intervisibility	Friction Surfaces	Graphical Methods	Stochastic Processes	Spatial Weights Matrix	Global Measures of Spatial Association	Local Measures of Spatial Association	Outliers	Bayesian Methods	Spatial Sampling for Statistical Analysis	Principles of Semi- variogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants	Principles of Spatial Econometrics	Spatial Autoregression Models	Spatial Filtering	Spatial Expansion & Geographically Weighted Regression
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
	Cultural Systems	5		2.76	0.66	1	1	1	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0
	Cultural Systems	6		2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem  -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
OTATI EMETITIO	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation		political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ixeguiation	19		1.47	0.83	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Intervisibility	Friction Surfaces	Graphical Methods	Stochastic Processes	Spatial Weights Matrix	Global Measures of Spatial Association	Local Measures of Spatial Association	Outliers	Bayesian Methods	Spatial Sampling for Statistical Analysis	Principles of Semivariogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants	Principles of Spatial Econometrics	Spatial Autoregression Models	Spatial Filtering	Spatial Expansion & Geographically Weighted Regression
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Í		22	visual resource assessment	1.91	0.88	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Í		23	agricultural and rural landscape analysis	1.68	0.85	1	1	1	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
Í		24	urban landscape	2.17	0.71	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	and	26	conservation of natural resources	2.33	0.8	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
1	Management at	27	historic preservation	1.73	0.76	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Various Scales	28	ecological planning principles	2.23	0.8	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	and Applications	29	Water resource management	1.91	0.84	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Í		30	wetland	1.78	0.83	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
1		31	floodplain management	1.8	0.86	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Í		33	treatment of toxic materials	1.05	0.86	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Í		34	design needs for special populations	1.91	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Í		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Í		36	roadway design principles	2.15	0.83	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS	Materials,	40	sustainable construction practices	1.82	0.84	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Í	Methods,	41		1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Í	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		44	erosion and sedimentation control	2.28	0.82	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		45	utility systems	1.77	0.77	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		46	Irrigation systems	1.75	0.88	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		47	lighting systems	1.7	0.79	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		48	structural considerations	2.06	0.82	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	and	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration		general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		56		1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u> </u>		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Intervisibility	Friction Surfaces	Graphical Methods	Stochastic Processes	Spatial Weights Matrix	Global Measures of Spatial Association	Local Measures of Spatial Association	Outliers	Bayesian Methods	Spatial Sampling for Statistical Analysis	Principles of Semivariogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants	Principles of Spatial Econometrics	Spatial Autoregression Models	Spatial Filtering	Spatial Expansion & Geographically Weighted Regression
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-59		1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings the roles of visual communication, including photographic and	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
	Communication	61	video documentation	2.25	0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		62	graphic presentation techniques, systems and symbols interpretive methods and techniques such as information	2.71	0.73	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
STATEMENTS		63	displays and brochures	1.82	0.98	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice		organizational management principles such as leadership principles and landscape architect career cycle	2.1 1.61 1.89	0.78 0.93	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0	0 0	0	0 0	0 0	0 0	0 0	0 0	0 0	0
		00		1.09	0.93	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	0	U	0
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landagana	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Intervisibility	Friction Surfaces	Graphical Methods	Stochastic Processes	Spatial Weights Matrix	Global Measures of Spatial Association	Local Measures of Spatial Association	Outliers	Bayesian Methods	Spatial Sampling for Statistical Analysis	Principles of Semi- variogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants	Principles of Spatial Econometrics	Spatial Autoregression Models	Spatial Filtering	Spatial Expansion & Geographically Weighted Regression
		74	Conduct field investigations to identify significant natura and cultural features, characteristics, and systems	2.06	0.74	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Natural & Cultural		Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems		Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0		0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Engineering:  Materials,  Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
	Construction Documentation		Manage the bidding/tendering process Provide construction administration and observation throughout the project	0.72 0.83	0.7 0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
	and Administration	94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Perform post construction evaluation Perform construction services including design-build	0.91 0.67	0.79 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Intervisibility	Friction Surfaces	Graphical Methods	Stochastic Processes	Spatial Weights Matrix	Global Measures of Spatial Association	Local Measures of Spatial Association	Outliers	Bayesian Methods	Spatial Sampling for Statistical Analysis	Principles of Semivariogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants	Principles of Spatial Econometrics	Spatial Autoregression Models	Spatial Filtering	Spatial Expansion & Geographically Weighted Regression
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		103	Review and critique peer work	1.79	0.88	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	rialli, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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ĺ				1	Average	0.45	0.26	0.20	0.17	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.03	0.00	0.08	0.08	0.00	0.00	0.00	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Problems of Large Spatial Databases	Data Mining Approaches	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Flow Modeling	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles	Linear Programming	Integer Programming	Location-allocation Modeling & p-median Problems	Sum	Average
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.05
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	1	1	1	0	0	1	1	1	1	0	0	0	26	0.44
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	20	0.34
	, , , , , , , , , , , , , , , , , , , ,	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	4	0.07
		7 8	regional hazard design considerations creativity and process including design theory and problem —solving strategies	2.1	0.87 0.64	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	5 4	0.08
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.14
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0.09
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	19	0.32
	and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	15	0.25
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	12	0.20
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	7	0.12
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.03
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0.07
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
	Regulation	10		1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0.08
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Problems of Large Spatial Databases	Data Mining Approaches	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Flow Modeling	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles	Linear Programming	Integer Programming	Location-allocation Modeling & p-median Problems	Sum	Average
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	10	0.17
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	12	0.20
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	15	0.25
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	13	0.22
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	10	0.17
	and	26		2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0.22
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.14
	and Applications	29		1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.12
		30		1.78	0.83	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0		0.22
		31	floodplain management	1.8	0.86	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	13	0.22
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0.10
		33	treatment of toxic materials	1.05	0.86		0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0.09
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.02
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		0.03
		36	, , ,	2.15	0.83	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	17	0.29
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	14	0.24
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
KNOWLEDGE	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.03
STATEMENTS	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.07
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.02
	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		0.17
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0.07
		44		2.28	0.82	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		0.10
	1	45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		0.15
	1	46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		0.14
	1	47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		0.14
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.05
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0.05
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	 2	0.03
	and	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Administration		general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	1		construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0		0	0	0		0.00
			basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Problems of Large Spatial Databases	Data Mining Approaches	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Flow Modeling	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles	Linear Programming	Integer Programming	Location-allocation Modeling & p-median Problems	Sum	Average
		determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		<del>59</del> consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0.00
		60 techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0.05
		62 graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6	0.10
KNOWLEDGE STATEMENTS		63 displays and brochures	1.82	0.98	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0.05
		64 public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		65 environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.03
		social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Values and Ethics in Practice	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		68 resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.05
	Landscape	To Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture.	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.07
COMPETENCIES	Architecture History & Criticism	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
		72 Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problem	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0.07

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Problems of Large Spatial Databases	Data Mining Approaches	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	1	Flow Modeling	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles	Linear Programming	Integer Programming	Location-allocation Modeling & p-median Problems	Sum	Average
		74	Conduct field investigations to identify significant natura and cultural features, characteristics, and systems	2.06	0.74	0	0 0	0	1	1	1	0	0	0	0	0	0	0	0	0	13	0.22
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9	0.15
	Systems		Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	10	0.17
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	8	0.14
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0.05
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)  Assist in the preparation of ordinances, regulations,	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.05
	regulation	80	covenants, standards, and guidelines Influence public policies on areas such as growth and land	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.03
			and water management by testifying, lobbying, or preparing written documents for public distribution  Develop a design program based on users' needs and clients'	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.03
	Design, Planning,	82	goals and resources  Analyze relationships among design elements by determining	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.03
COMPETENCIES	and Management at Various Scales and	83	opportunities and constraints Develop conceptual design, planning, and management	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.14
	Applications	85	Solutions Evaluate design alternatives to determine the	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.07
	Cita Daniera and	86	appropriate solution  Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	15	0.25
	Site Design and Engineering: Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	11	0.19
	Methods, Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	12	0.20
	ини дрисинона	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.03
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
		91	Prepare contract documents including agreements, general conditions, and bid documents  Manage the bidding/tendering process	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Construction Documentation	93	Provide construction administration and observation throughout the project	0.72	0.7 0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	and Administration	94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			Perform post construction evaluation Perform construction services including design-build	0.91 0.67	0.79 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Problems of Large Spatial Databases	Data Mining Approaches	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Flow Modeling	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles	Linear Programming	Integer Programming	Location-allocation Modeling & p-median Problems	Sum	Average
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0.05
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
0014055510150		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES				0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Values and Ethics in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		109	rrain, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
					Sum	0	0	4	10	15	15	9	0	8	9	16	4	0	0	0		
					Average	0.00	0.00	0.04	0.09	0.14	0.14	0.08	0.00	0.07	0.08	0.15	0.04	0.00	0.00	0.00		

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	Landscape Architecture	1 histo	ory of landscape architecture and allied professions	2.15	0.69	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0
	History and Criticism	2 histo	oric preservation principles	1.69	0.83	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0
			d information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Natural and		terns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Cultural Systems		ural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
			ial and cultural influences on design	2.19	0.81	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		crea	ional hazard design considerations ativity and process including design theory and problem lying strategies	2.1	0.87	0 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			thetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
KNOWLEDGE		10 hum	nan factors such as behavior, perception, psychological and sory response	2.33	0.76	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
STATEMENTS		11 natu	ural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Design and Planning Theories and	12 resourba	tionship between human and natural systems such as burce conservation, habitat restoration and creation, and an ecology	2.36	0.79	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
	Methodologies	13 decis	lence of context on design, planning, and management isions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		14 appli	earch methods including data collection, interpretation, and lication of results	2.37	0.93	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
			rapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		knov	nmunication and education methods, including sharing wledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Public Policy and	1 /	ernmental policies and laws that affect the use and elopment of land	1.8	0.85	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Regulation	18 politi	tical and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
			d and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		20 eme	erging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology			Percepti of g	From Concepts to Data	Geography as a Foundation for GIS	Place & Landscape	Common-sense Geographies			Space		Relation Spa		Dis	ú	ഥ	Integrated Mod
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	and Applications		Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		33	treatment of toxic materials	1.05	0.86	0	0	0		0	0	0	0	0	1	0	0	0	0	0	0	0	0
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	Perception & Cognition of geographic Phenomena	From Concepts to Data	Geography as a Foundation for GIS	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Space	Time	Relationship between Space &Time	Properties	Discrete Entities	Events & Processes	Fields in Space & Time	ted Mod
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction	51		1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	53		1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration	54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		59		1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		65		2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice		organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	Perception & Cognition of geographic Phenomena	From Concepts to Data	Geography as a Foundation for GIS	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Space	Time	Relationship between Space &Time	Properties	Discrete Entities	Events & Processes	Fields in Space & Time	β
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
			Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	Perception & Cognition of geographic Phenomena	From Concepts to Data	Geography as a Foundation for GIS	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Space	Time	Relationship between Space & Time	Properties	Discrete Entities	Events & Processes	Fields in Space & Time	Integrated Models
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	and Management at Various Scales	83	opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	84	SOIUTIONS	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Technologies	88	circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structura issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	Perception & Cognition of geographic Phenomena	From Concepts to Data	Geography as a Foundation for GIS	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Space	Time	Relationship between Space & Time	Properties	Discrete Entities	Events & Processes	Fields in Space & Time	ted Mod
		Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction	92 Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Documentation	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	94 Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95 Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96 Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		98 Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OOMI ETENOILO		100 Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102 Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-		103 Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		104 Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		105 Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ethics in Practice	continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108 Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109 Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110 Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Sum	6	2	1	0	4	0	6	2	8	24	0	0	0	3	0	1	3	15
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Categories	Mereology: Structural Relationships	Genealogical Relationships: Lineage, Inheritance	Topological Relationships	Metrical Relationships: Distance & Direction	Spatial Distribution	Region	Spatial Integration	Vagueness	Mathematical Models of Vagueness: Fuzzy Sets & Rough Sets	Error-based Uncertainty	Mathematical Models of Uncertainty: Probability & Statistics	Sum	Average
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	1	0	0	0	0	6	0.20
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0.10
		3		2.55	0.77	0	0	0	0	0	0	1	0	0	0	0	0		0.07
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	1	0	0	0	0	0		0.07
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	1	1	0	0	0	0	0		0.13
		6 7	social and cultural influences on design regional hazard design considerations	2.19 2.1	0.81 0.87	0	0	0	0	0	0	0	0	0	0	0	0		0.07
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	1	0	0	0	0	0		0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0.07
STATEMENTS	<b>.</b>	11		2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	2	0.07
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	3	0.10
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0.10
		15	· · · · · · · · · · · · · · · · · · ·	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0		0.03
	Regulation	18		1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0.03
	]	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0.03
	ĺ	20	emerging trends and issues	1.65	0.83	0	0	0	0	0	1	0	0	0	0	0	0	2	0.07

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Categories	Mereology: Structural Relationships		Topological Relationships	Metrical Relationships: Distance & Direction	-	Region	Spatial Integration	Vagueness	Mathematical Models of Vagueness: Fuzzy Sets & Rough Sets	Error-based Uncertainty	Mathematical Models of Uncertainty: Probability & Statistics	Sum
		21		1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1 0.03
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	1	0	0	0	0	0	0	2 0.07
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0	0	0	0	1 0.03
		24		2.17	0.71	0	0	0	0	0	1	0	0	0	0	0	0	1 0.03
	Design, Planning		planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	and	26		2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	2 0.07
	Management at	27		1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	3 0.10
	Various Scales	28	ecological planning principles	2.23	8.0	0	0	0	0	0	0	0	0	0	0	0	0	2 0.07
	and Applications	29		1.91	0.84	0	0	0	0	0	0	1	0	0	0	0	0	3 0.10
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	1 0.03
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	2 0.07
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	2 0.07
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	1 0.03
KNOWLEDGE		34		1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1 0.03
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	1 0.03
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	Engineering:	39	•	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00
	1	48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0 0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Categories	Mereology: Structural Relationships	Genealogical Relationships: Lineage, Inheritance	Topological Relationships	Metrical Relationships: Distance & Direction	Spatial Distribution	Region	Spatial Integration	Vagueness	Mathematical Models of Vagueness: Fuzzy Sets & Rough Sets	Error-based Uncertainty	Mathematical Models of Uncertainty: Probability & Statistics	E i	Average
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	О	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction	51		1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	1	0	0	0	0	0	2	0.07
	and	53		1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Administration	54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	
STATEMENTS		59		1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	
		60	<u> </u>	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	
		62		2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		64		1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		65		2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	O	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03

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			Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	2	0.07
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural & Cultural		Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Systems		Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	2	0.07
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	2	0.07
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	1	0	0	0	0	0	0	3	0.10
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	2	0.07
	Technologies	88	circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Categories	Mereology: Structural Relationships	Genealogical Relationships: Lineage, Inheritance	Topological Relationships	Metrical Relationships: Distance & Direction	Spatial Distribution	Region	Spatial Integration	Vagueness	Mathematical Models of Vagueness: Fuzzy Sets & Rough Sets	Error-based Uncertainty	Mathematical Models of Uncertainty: Probability & Statistics	Sum	Average
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction	92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Documentation	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Administration	94	Conduct project closure including review and distribution of close out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		100	<u> </u>	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Values and	106		0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Ethics in Practice	I I	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
					Sum	0	0	0	0	0	6	7	1	0	0	0	0		
					Average	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.01	0.00	0.00	0.00	0.00		

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Data Abstraction: Classification, Selection, & Generalization	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Web Mapping & Visualization	Virtual & Immersive Environments	Spatialization	Visualization of Temporal Geographic Data	Visualization of Uncertainty
	Landscape Architecture History and	1	history of landscape architecture and allied professions	2.15	0.69	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Canara Cyclomo	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS	Design and	11		2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	[	15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11 <del>0</del> gulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		21	photogrammetry and remote sensing	1.47	0.84	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	_	22	visual resource assessment	1.91	0.88	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	0	1	0
	_	23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	_	24	urban landscape	2.17	0.71	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	and	26	conservation of natural resources	2.33	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u>-</u>	31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE	Site Design and Engineering:	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS	Materials,	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
		43 44	biofiltration and other alternative drainage methods	1.91 2.28	0.84 0.82	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	-			1.77	0.82	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	-		utility systems	1.75	0.77	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	-		Irrigation systems lighting systems	1.73	0.88	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	-		structural considerations	2.06	0.79	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		49	quality control procedures for construction, such as delivery,	1.27	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	storage, testing, etc. sequencing of design, approval, permitting, and construction	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-		activities the life cycle cost analysis process		0.86	0																	
	Construction	51 52	the life-cycle cost-analysis process geographic coordinate systems and layout techniques and	1.32 1.9	0.86	0	0	0	0	0	0	0 1	0	0 1	0	0	0	0	0	0	0	0	0
	Documentation		conventions												•		-						
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>	55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Data Abstraction: Classification, Selection, & Generalization	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Web Mapping & Visualization	Virtual & Immersive Environments	Spatialization	Visualization of Temporal Geographic Data	Visualization of Uncertainty
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	0	1	1	0	1	1	1_	0	1	1	0	0	0	1	0
1410111 5505		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	0	1	1
KNOWLEDGE STATEMENTS		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		65 66	environmental ethics social responsibility in design	2.08	0.82 0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68		1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Data Abstraction: Classification, Selection, & Generalization	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Web Mapping & Visualization	Virtual & Immersive Environments	Spatialization	Visualization of Temporal Geographic Data	Visualization of Uncertainty
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction	92	Manage the bidding/tendering process  Provide construction administration and observation throughout	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Documentation	93	the project  Conduct project closure including review and distribution of close-	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	94	out documents  Perform post construction evaluation	0.67 0.91	0.73 0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Perform construction evaluation  Perform construction services including design-build	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Data Abstraction: Classification, Selection, & Generalization	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Web Mapping & Visualization	Virtual & Immersive Environments	Spatialization	Visualization of Temporal Geographic Data	Visualization of Uncertainty
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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					Sum	6	8	6	0	6	17	2	5	4	4	3	5	6	0	2	0	3	1
					Average	0.05	0.07	0.06	0.00	0.05	0.15	0.02	0.05	0.04	0.04	0.03	0.05	0.05	0.00	0.02	0.00	0.03	0.01

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	Landscape Architecture History and	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	2	0.07
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0.00
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0.00
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0.00
	Oditarai Oystonis	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0.00
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	1	0.04
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	2	0.07
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0.00
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0.00
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	2	0.07
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	1	0	5	0.19
	Duklia Dallassas I	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	 0	0.00
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0.00
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0.00

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		21	photogrammetry and remote sensing	1.47	0.84	0	1	0	0	0	1	1	0	0		0.22
		22	visual resource assessment	1.91	0.88	0	1	1	0	1	1	1	0	0	14	0.52
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0	2	0.07
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	1	0.04
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	1	0.04
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0.00
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0.00
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	1	0.04
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE	Site Design and Engineering:	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS	Materials,	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0.00
O 17 (1 E IVI E IVI O	Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	2	0.07
	and rippinoutions	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	1	0.04
		44	erosion and sedimentation control	2.28 1.77	0.82 0.77	0	0	0	0	0	0	0	0	0	1	0.04
		45 46	utility systems Irrigation systems	1.77	0.77	0	0	0	0	0	0	0	0	0	1	0.04
			lighting systems	1.73	0.79	0	0	0	0	0	0	0	0	0		0.04
		48	structural considerations	2.06	0.73	0	0	0	0	0	0	0	0	0		0.04
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0		0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0.00
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	1	0	0		0.33
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0		0.00
1		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0		0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computational Issues	Map Production	Map Reproduction	The Power of Maps	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing	Impact of Uncertainty	Sum	Average
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	1	0	1	0.04
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	1	1	0	1	0	14	0.52
1410/4// 5505		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	0	0	1	0	0	1	0	16	0.59
KNOWLEDGE STATEMENTS		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	2	0.07
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0.00
		65 66	environmental ethics social responsibility in design	2.08	0.82 0.78	0	0	0	0	0	0	0	0	0	0	0.00
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.78	0	0	0	0	0	0	0	0	0	0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0.00
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0.00
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	1	0.04
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0.00
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0.00
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computational Issues	Map Production	Map Reproduction	The Power of Maps	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing	Impact of Uncertainty	Sum	Average
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0.00
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0.00
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0.00
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0.00
	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0.00
	and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0.00
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	1	0.04
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	1	0.04
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	1	0.04
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	1	0.04
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0.00
	Construction	92	Manage the bidding/tendering process  Provide construction administration and observation throughout	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0.00
	Documentation and Administration	93	the project  Conduct project closure including review and distribution of close-	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0.00
	and Administration	94	out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0.00
		95 96	Perform post construction evaluation Perform construction services including design-build	0.91 0.67	0.79 0.7	0	0	0	0	0	0	0	0	0	0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	 0	0.00

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		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	1	0	0	0	0	0	0	5	0.19
(	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	1	0	0	0	0	0	0	1	0.04
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0.00
	  -		Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0.00
	<u> </u>	105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0.00
	/alues and Ethics	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0.00
l V	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0.00
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Using Models to Represent information & processes	Components of Models: Data, Structures, Procedures	Scope of GIS&T Applications	Scope of GIS&T Design	Process of GIS&T Design	Problem Definition	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Feasibility Analysis	Software Systems	Data Costs	Labor Management	Capital: Facilities & Equipment	Funding	Modeling Tools	Conceptual Models	Logical Models	Physical Models
	Landscape Architecture History and	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Cysterns	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		8	creativity and process including design theory and problem  —solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
STATEMENTS		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O I A I E I I E I I E I I E I E I E I E I		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Using Models to Represent information & processes	Components of Models: Data, Structures, Procedures	Scope of GIS&T Applications	Scope of GIS&T Design	Process of GIS&T Design	Problem Definition	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Feasibility Analysis	Software Systems		Labor Management	Capital: Facilities & Equipment	Funding	Modeling Tools	Conceptual Models	Logical Models	Physical Models
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Regulation	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Negulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ļ.	24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ļ.	30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ļ.	31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTATEMENTO		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>	35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	41		1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	42		2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	απά Αργιισατίστιδ	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>	44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	[	60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	[	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Using Models to Represent information & processes	Components of Models: Data, Structures, Procedures	Scope of GIS&T Applications	Scope of GIS&T Design	Process of GIS&T Design	Problem Definition	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Feasibility Analysis	Software Systems	Data Costs	Labor Management	Capital: Facilities & Equipment	Funding	Modeling Tools	Conceptual Models	Logical Models	Physical Models
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	απα Αρμποαποπο	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMI ETENCIEC		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
_		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	_	105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Coupling Scientific Models with GIS	Formalizing a Procedure Design	Workflow Analysis & Design	User Interfaces	Development Environments for Geospatial Applications	Computer-aided Software Engineering (CASE) Tools	Implementation Planning	Implementation Tasks	System Testing	System Deployment	wns	Average
	Landscape Architecture History and	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		7 8	regional hazard design considerations creativity and process including design theory and problem	2.1 2.83	0.87 0.64	0	0	0	0	0	0	0	0	0	0	0	0	3	0.00
KNOWLEDGE			-solving strategies									_					_		
STATEMENTS		9	aesthetic principles of design human factors such as behavior, perception, psychological and	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		10	sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	3	0.09

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	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		23	agricultural and rural landscape analysis	1.68	0.85	0	1	0	0	0	0	0	0	0	0	0	0	1	0.03
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		30	wetland	1.78	0.83		0	0	0	0	0	0	0	0	0	0	0	0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE STATEMENTS		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	[	46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0			0.03
STATEMENTS		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0.00
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	1	0	0	0	0	0	0	0	0			0.03
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	0	0	0	0	0	0	0	0	0		4	0.13
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0			0.00
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0.00
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Coupling Scientific Models with GIS	Formalizing a Procedure Design	Workflow Analysis & Design	User Interfaces	Eevenopment Environments for Geospatial Applications	Computer-aided Software Engineering (CASE) Tools	Implementation Planning	Implementation Tasks	System Testing	System Deployment	Sum	Average
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	1	0	0	0	1	0.03

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Coupling Scientific Models with GIS	Formalizing a Procedure Design	Workflow Analysis & Design	User Interfaces	Development Environments for Geospatial Applications	Computer-aided Software Engineering (CASE) Tools	Implementation Planning	Implementation Tasks	System Testing	System Deployment	Sum	Average
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction Documentation	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	1	0	0	0	0	0	0	4	0.13
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	
	-		Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	-	106	Manage risk and liability	0.86	0.81 0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Values and Ethics	100	Negotiate and prepare client and consultant agreements	0.7-	0.70	U		0	0		J	•	U		0		0		0.00
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	
	<u> </u>		Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	
	-		Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	2	
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Basic Data Structures	Data Retrieval Strategies	Coevolution of DBMS & GIS	Relational DBMS	Object-oriented DBMS	Extensions of the Relational Model	Grid Representations	The Raster Model	*Grid Compression Methods	The Hexagonal Model	Triangulated Irregular Network (TIN) Model	Resolution	Hierarchical Data Models	Geometric Primitives	The Spaghetti Model	The Topological Model	Classic Vector Data Models	The Network Model	Linear Referencing	Object-based Spatial Databases	Spatio-temproal GIS	Modeling Uncertainty	Modeling Three- dimensional Entities	Sum	Average
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
	Outural Oysterns	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	J.00
		8	creativity and process including design theory and problem  -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	J.00
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	J.00
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	O.00
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	ე.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	ე.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	J.00
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
	_	20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	J.00

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Basic Data Structures	Data Retrieval Strategies	Coevolution of DBMS & GIS	Relational DBMS	Object-oriented DBMS	Extensions of the Relational Model	Grid Representations	The Raster Model	*Grid Compression Methods	The Hexagonal Model	Triangulated Irregular Network (TIN) Model	Resolution	Hierarchical Data Models	Geometric Primitives	The Spaghetti Model	The Topological Model	Classic Vector Data Models	The Network Model	Linear Referencing	Object-based Spatial Databases	Spatio-temproal GIS	Modeling Uncertainty	Modeling Three- dimensional Entities		Sum
		21 photogrammetry and remote sensing	1.47	0.84	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0 0.0
		22 visual resource assessment	1.91	0.88	0	_	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0 0.0
		23 agricultural and rural landscape analysis	1.68	0.85	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0 0.0
		24 urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
	Design, Planning		2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
	and	26 conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0 0.0
		27 historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0 0.0
	Various Scales	28 ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0 0.0
	and Applications	29 Water resource management 30 wetland	1.91 1.78	0.84 0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0 0.0
		31 floodplain management	1.78	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		-	0 0.0
		land and water realemetics procedures including quarry mine																0										1	
		and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	U	0	0	0	0	0	0	0	0	0		0.0
		33 treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0			0 0.0
		design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4	0 0.0
		35 accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0			1 0.0
		36 roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1 0.0
		elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
KNOWLEDGE	Site Design and	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0
STATEMENTS	Engineering: Materials,	39 noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
O I / (I E M E I V I O	Methods,	40 sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		_	0 0.0
	Technologies	41 construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0 0.0
	and Applications	<ul><li>42 grading, drainage and stormwater treatment</li><li>43 biofiltration and other alternative drainage methods</li></ul>	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		₩	0 0.0
		<ul><li>43 biofiltration and other alternative drainage methods</li><li>44 erosion and sedimentation control</li></ul>	1.91 2.28	0.84 0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		+	0 0.0
		45 utility systems	1.77	0.82	0		0	0	0		0			0		0	0	0	0	0	0	0	_		0	_		+	0 0.0
		46 Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			1	0 0.0
		47 lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			1	0 0.0
		48 structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
		quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
		sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
	Construction	51 the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0
	Documentation	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		2 0.0
	and	53 specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0.0
	Administration	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0 0.0
		55 construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<b>†</b>	0 0.0
		56 basic construction law	1.48	0.84	0	_	0	0			0	0	0		0	0		0	0	0	0	0			0	_	_	1	0 0.0
		57 construction contracts	1.55	0.88	0		0	0	_	_	0	0	0	0		0	0	0	0	0	0	0			0				0 0.0

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		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	00
		59		1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0	
		60		1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0	<u> </u>
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	4 0.4	17
		62		2.71	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1		4 0.	17
KNOWLEDGE STATEMENTS		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0	J0
STATEMENTS		64		1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	00
		65		2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0	<u>J0</u>
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	Э0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0	J0
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	00
		70	relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	00
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО
			Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО
	Natural &	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО
	Cultural Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО
			Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0.0	ЭО

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Basic Data Structures	Data Retrieval Strategies	Coevolution of DBMS & GIS	Relational DBMS	Object-oriented DBMS	Extensions of the Relational Model	Grid Representations	The Raster Model	*Grid Compression Methods	The Hexagonal Model	Triangulated Irregular Network (TIN) Model	Resolution	Hierarchical Data Models	Geometric Primitives	The Spaghetti Model	e Topological Model	Classic Vector Data Models	The Network Model	Linear Referencing	Object-based Spatial Databases	Spatio-temproal GIS	Modeling Uncertainty	Modeling Three- dimensional Entities	Sum	Average
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0 0	0	<u>ර</u> 0	0	0	0	0	0	0	0	0	0	0	0	0	O	0	0	0	0	0	0	0		0.00
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design,	82	goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Planning, and Management at		opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales and	84	Solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Materials, Methods,	87	storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.04
	and Applications	89	issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		90	drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		91	conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Construction		2 Manage the bidding/tendering process Provide construction administration and observation throughout	0.72	0.7	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
	Documentation and		the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Administration		out documents  Perform post construction evaluation	0.67 0.91	0.73 0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			6 Perform construction services including design-build	0.91	0.79	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	0	0		0	0			0.00
		97	Propage management and maintenance manuals and	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Basic Data Structures	Data Retrieval Strategies	Coevolution of DBMS & GIS	Relational DBMS	Object-oriented DBMS	Extensions of the Relational Model	Grid Representations	The Raster Model	*Grid Compression Methods	The Hexagonal Model	Triangulated Irregular Network (TIN) Model	Resolution	Hierarchical Data Models	Geometric Primitives	The Spaghetti Model	The Topological Model	Classic Vector Data Models	The Network Model	Linear Referencing	Object-based Spatial Databases	Spatio-temproal GIS	Modeling Uncertainty	Modeling Threedimensional Entities	Sum	Average
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	4 (	0.17
	Communication	101	Dranage and deliver arel presentations such as meetings	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
			Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
COMPETENCIES			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	
			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Values and	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Ethics in Practice	107	continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
					Cum	0	0	0	0	0	0	0	2	1	0	4	4	0	2	0	2	0	2	4	0	0	0	2		
					Sum	0	0.00	0	0	0	0.00	0	3	1	0	0.04	0.04	0	2		2	0	3	1	0	0	0	3		
					Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.01	0.01	0.00	0.02	0.00	0.02	0.00	0.03	0.01	0.00	0.00	0.00	0.03		

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resampling	Coordinate Transformations	Scale & Generalization	Point, Line, & Area Generalization	Classification & Transformation of Attribute Measurement Levels	Aggregation of Spatial Entities	Database Change	Modeling Database Change	Reconciling Database Change	Managing Versioned Geospatial Databases	Sum	Average
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.07
	Natural and Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
STATEMENTS		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.07
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.07
	wethodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.07
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	1	0	0	0	3	0.21
		15		1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0.14
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	1	0	0	0	0		0.07
	Regulation	18		1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	rtogulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Impacts of Transformations	Da	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resampling	Coordinate Transformations	Sca	Point, Line, & Area Generalization	Classification & Transformation of Attribute Measurement Levels	Aggregation of Spatial Entities	Database Change	Modeling Database Change	Reconciling Database Change	Managing Versioned Geospatial Databases	Sum	
		21 photogrammetry and remote sensing	1.47	0.84	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3 0.2	
		22 visual resource assessment	1.91	0.88	1	0	0	1	1	0	1	0	0	0	0	0	0	0	4 0.2	
		23 agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
		24 urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0	)0
	Design, Planning and	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1 0.0	
	Management at Various	26 conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
	Scales	27 historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	)0
	and Applications	28 ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
	and Applications	29 Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	)0
		30 wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	)0
		31 floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	)0
		land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
		33 treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
KNOWLEDGE		34 design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
STATEMENTS		35 accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
		36 roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
		elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0	)0
	Site Design and	38 landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	)0
	Engineering:	39 noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
	Materials, Methods,	40 sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
	Technologies	41 construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
	and Applications	42 grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
	* *	43 biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
		44 erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	)0
		45 utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
		46 Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
		47 lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	00
		48 structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resampling	Coordinate Transformations	Scale & Generalization	Point, Line, & Area Generalization	Classification & Transformation of Attribute Measurement Levels	Aggregation of Spatial Entities	Database Change	Modeling Database Change	Reconciling Database Change	Managing Versioned Geospatial Databases		Sum	Average
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	i l	0	0.00
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	0	0	1	0	0	0	0	0	0	0	0		4	0.29
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
STATEMENTS		59		1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	1	0	0	0	0	0	0	0	0	0	0	0		1	0.07
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resampling	Coordinate Transformations	Scale & Generalization	Point, Line, & Area Generalization	Classification & Transformation of Attribute Measurement Levels	Aggregation of Spatial Entities	Database Change	Modeling Database Change	Reconciling Database Change	Managing Versioned Geospatial Databases	Sum Average
			Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0
	Landscape Architecture History & Criticism		Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0.0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resampling	Coordinate Transformations	Scale & Generalization	Point, Line, & Area Generalization	Classification & Transformation of Attribute Measurement Levels	Aggregation of Spatial Entities	Database Change	Modeling Database Change	Reconciling Database Change	Managing Versioned Geospatial Databases	Sum	Average
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1 (	0.07
		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Design, Planning, and Management at Various	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Scales and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
COMPETENCIES	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	Engineering: Materials, Methods, Technologies	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
	and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Construction	92	Manage the bidding/tendering process Provide construction administration and observation throughout	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Documentation and Administration	94	the project  Conduct project closure including review and distribution of close out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		96 97	Perform construction services including design-build Prepare management and maintenance manuals and	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		31	documents	0.01	0.7	0	U	U	U	U	0	U	U	U	U	U	U	U	U		7.00

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	Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resampling	Coordinate Transformations	Scale & Generalization	Point, Line, & Area Generalization	Classification & Transformation of Attribute Measurement Levels	Aggregation of Spatial Entities	Database Change	Modeling Database Change	Reconciling Database Change	Managing Versioned Geospatial Databases	Sum	Average
			98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			100		2.19	0.76	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0.14
		Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
				Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	COMPETENCIES			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
				Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	 0	0.00
		Values and Ethics in	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		Practice	107	continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
				Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
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						Sum	4	3	3	3	2	1	3	0	0	6	1	0	0	0	 	
						Average	0.04	0.03	0.03	0.03	0.02	0.01	0.03	0.00	0.00	0.05	U.U1	0.00	0.00	0.00		

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Origins	Trends	High Performance Computing	Computational Intelligence	Non-Linearity Relationships & non- Gaussian Distributions	Pattern Recognition	Geospatial Data Classification	Multi-layer Feed- forward Neutral	Space-scale Algorithms	Rule Learning	Neutral Network Schemes	CA Model Structure	CA Transition Rule	CA Simulation & Calibration	Integration of CA & Other Geocomputation Methods	Typical CA Applications
	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Outtain Oystonis	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem  —solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	_	9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dublia Daliana d	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Origins	Trends	High Performance Computing	Computational Intelligence	Non-Linearity Relationships & non- Gaussian Distributions	Pattern Recognition	Geospatial Data Classification	Multi-layer Feed- forward Neutral	Space-scale Algorithms	Rule Learning	Neutral Network Schemes	CA Model Structure	CA Transition Rule	CA Simulation & Calibration	Integration of CA & Other Geocomputation Methods  Typical CA Applications
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		22	visual resource assessment agricultural and rural landscape analysis	1.91 1.68	0.88 0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0 0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Management at Various Scales	27 28	historic preservation ecological planning principles	1.73 2.23	0.76 0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		30	wetland floodplain management	1.78 1.8	0.83 0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		32	land and water reclamation procedures including quarry, mine and	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		33	landfill reclamation treatment of toxic materials	1.43	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		34	design needs for special populations	1.03	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		36 37	roadway design principles elements of vehicular and pedestrian circulation systems and their design requirements	2.15 2.57	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Materials, Methods,	40	sustainable construction practices	1.82 1.76	0.84 0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Technologies and Applications	41	construction equipment and technologies grading, drainage and stormwater treatment	2.78	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0 0
		44 45	erosion and sedimentation control utility systems	2.28 1.77	0.82 0.77	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0 0
KNOWLEDGE		46	Irrigation systems	1.75	0.88	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0 0
STATEMENTS		47 48	lighting systems structural considerations	1.7 2.06	0.79 0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Construction	51	the life-cycle cost-analysis process geographic coordinate systems and layout techniques and	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Documentation	52	conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	and Administration	53	specification types and components for a project general and supplemental conditions, special provisions, and	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		54	technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		55 56	construction administration and details basic construction law	1.73 1.48	0.92 0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
			construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
			techniques for conducting meetings the roles of visual communication, including photographic and	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Communication	61	video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		62	graphic presentation techniques, systems and symbols interpretive methods and techniques such as information displays	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		63	and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		64 65	public relations, outreach, and image development environmental ethics	1.49 2.08	0.97 0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	[,,, <u>-</u> ]		social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	<u> </u>	68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Origins	Trends	High Performance Computing	Computational Intelligence	Non-Linearity Relationships & non- Gaussian Distributions	Pattern Recognition	Geospatial Data Classification	Multi-layer Feed- forward Neutral Networks	Space-scale Algorithms	Rule Learning	Neutral Network Schemes	CA Model Structure	CA Transition Rule	CA Simulation & Calibration	Integration of CA & Other Geocomputation Methods	Typical CA Applications
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Danier Blancier	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	86	land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
, l <sub>c</sub>	Construction  Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
_		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OOMI ETENOIEO		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
,	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
_		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
١	Values and Ethics	106	Negotiate and prepare client and consultant agreements Participate in life-long learning (e.g., a professional organization,	0.74	0.79		0			, and the second	0	0	0	0	0	0	0	0			
	in Practice	107	continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	108 109	Participate in professional and public service activities  Train, educate and mentor other professionals	1.58 0.96	0.83 0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<del> </del>		•				0	0	0		0	0	0	0	0	0	0	0			0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	U	0	0	0	0	0	0	0
					Sum	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
					Average		0.00		0.00	0.00	0.05		0.00	_	0.00			0.00		0.00	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Greedy Heuristics	Interchange Heuristics	Interchange with Probability	Simulated Annealing	Lagrangian Relaxation	GA & Global Solutions	Genetic Algorithms & Artificial Genomes	Structure of Agent Based Models	Specification of Agent Based Models	Adaptive Agents	Microsimulation & Calibration of Agent Activities	Encoding Agent-based Models	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Scale & Zoning	Propagation of Error in Geospatial Modeling	Theory of Error Propagation	Problems of Currency, Source, & Scale
	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	ounara oyotomo	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem —solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resourc conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dublic Deliev card	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		22 23	visual resource assessment agricultural and rural landscape analysis	1.91 1.68	0.88 0.85	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.03	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhoo planning	2.12	0.76	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at Various Scales	27 28	historic preservation ecological planning principles	1.73 2.23	0.76 0.8	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management land and water reclamation procedures including quarry, mine and	1.8	0.86	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		32	landfill reclamation	1.43	0.84	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		34 35	design needs for special populations accessibility regulations	1.91 2.28	0.78 0.87	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	39	noise attenuation and mitigation techniques	1.66 1.82	0.82 0.84	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods, Technologies	40 41	sustainable construction practices construction equipment and technologies	1.76	0.87	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		43 44	biofiltration and other alternative drainage methods erosion and sedimentation control	1.91 2.28	0.84 0.82	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.82	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		47 48	lighting systems structural considerations	1.7 2.06	0.79 0.82	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.82	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0 0	0	0	0	0	0	0	0	1	0	0	0	1
	and Administration		specification types and components for a project qeneral and supplemental conditions, special provisions, and	1.89	0.83	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		54	technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		55 56	construction administration and details basic construction law	1.73 1.48	0.92 0.84	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
			construction contracts	1.55	0.88	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0		0 0	0	0	0	0	0	0	0	0	0	0	0	0
			techniques for conducting meetings the roles of visual communication, including photographic and	1.59	0.97	0	0	0	0		0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61 62	video documentation graphic presentation techniques, systems and symbols	2.25 2.71	0.85 0.73	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays	1.82	0.73	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		64	and brochures public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	66 67	organizational management principles such as leadership	2.1 1.61	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0
		68	principles and landscape architect career cycle resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0

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		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)  Confirm code compliance (e.g. zoning, environment, and	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	accessibility) Assist in the preparation of ordinances, regulations, covenants,	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	rtogulation	80	Influence public policies on areas such as growth and land and	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Greedy Heuristics	Interchange Heuristics	Interchange with Probability	Simulated Annealing	Lagrangian Relaxation	GA & Global Solutions	Genetic Algorithms & Artificial Genomes	Structure of Agent Based Models	Specification of Agent Based Models	Adaptive Agents	Microsimulation & Calibration of Agent Activities	Encoding Agent-based Models	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Scale & Zoning	Propagation of Error in Geospatial Modeling	Theory of Error Propagation	Problems of Currency, Source, & Scale
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and	93	Provide construction administration and observation throughout th project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMI ETENCIES		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>		Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u> </u>		Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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					Sum	0	0	0	0	0	0	0	0	0	0	0	0	5	4	2	0	0	0	2
					Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.02	0.00	0.00	0.00	0.02

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Fuzzy Logic	Fuzzy Measures	Fuzzy Aggregation Operators	Standardization	Weighting Schemes	Sum	Average
	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0.00
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0.00
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	1	0.03
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	1	0.03
	Outural Oystoms	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0.00
		8	creativity and process including design theory and problem —solving strategies	2.83	0.64	0	0	0	0	0	1	0.03
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0.00
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0.00
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	1	0.03
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0.00
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0.00
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0.00
	Regulation	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0.00
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Fuzzy Logic	Fuzzy Measures	Fuzzy Aggregation Operators	Standardization	Weighting Schemes	Sum	Average
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0.0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	2	
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0.0
		24	urban landscape planning principles including regional community and neighborhoo	2.17	0.71	0	0	0	0	0	0	0.0
	Design, Planning	25	planning	2.12	0.76	0	0	0	0	0	0	0.0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0.0
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0.0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0.0
	and Applications	29	Water resource management wetland	1.91	0.84	0	0	0	0	0	0	0.0
		30 31	floodplain management	1.78 1.8	0.83 0.86	0	0	0	0	0	0	0.0
			land and water reclamation procedures including quarry, mine and									
		32	landfill reclamation	1.43	0.84	0	0	0	0	0	0	0.0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0.0
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0.0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0.0
		36	roadway design principles elements of vehicular and pedestrian circulation systems and their	2.15	0.83	0	0	0	0	0	0	0.0
		37	design requirements landscape maintenance techniques, materials, equipment, and	2.57	0.72	0	0	0	0	0	0	0.0
	Site Design and	38	practices	1.93	0.87	0	0	0	0	0	0	0.0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0.0
	Materials, Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0.0
	Technologies	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0.0
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0.0
		43	biofiltration and other alternative drainage methods erosion and sedimentation control	1.91 2.28	0.84 0.82	0	0	0	0	0	0	0.0
		45	utility systems	1.77	0.82	0	0	0	0	0	1	0.0
KNOWLEDGE		46	Irrigation systems	1.75	0.88	0	0	0	0	0	1	0.0
STATEMENTS		47	lighting systems	1.7	0.79	0	0	0	0	0	1	0.0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0.0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0.0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0.0
	0		the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0.0
	Construction	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	2	0.0
	Documentation and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0.0
	a.ia / a.iiiiiotiadoli	54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0.0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0.0
		56	basic construction law	1.48	0.92	0	0	0	0	0	0	0.0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0.0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0.0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0.0
			techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	_
	Communication	61	the roles of visual communication, including photographic and	2.25	0.85	0	0	0	0	0	1	0.0
	2331110411011		video documentation									
		62	graphic presentation techniques, systems and symbols interpretive methods and techniques such as information displays	2.71	0.73	0	0	0	0	0	3	0.0
		63	and brochures	1.82	0.98	0	0	0	0	0	0	0.0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0.0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0.0
	V-1 1511	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0.0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0.0
	1	1	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0.0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Fuzzy Logic	Fuzzy Measures	Fuzzy Aggregation Operators	Standardization	Weighting Schemes	Sum	Average
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0.00
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0.00
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0.00
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0.00
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0.00
COMPETENCIES		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0.00
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0.00
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0.00
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0.00
		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0.00
	Design, Planning, and Management	83	Analyze relationships among design elements by determining	2.33	0.62	0	0	0	0	0	0	0.00
	at Various Scales and	84	opportunities and constraints  Develop conceptual design, planning, and management	2.39	0.61	0	0	0	0	0	0	0.00
	Applications	85	solutions  Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	1	0.03
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0.00
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0.00
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Fuzzy Logic	Fuzzy Measures	Fuzzy Aggregation Operators	Standardization	Weighting Schemes	Sum	Average
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0.00
	Construction Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0.00
	Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0.00
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0.00
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0.00
OOMI ETENOIEO		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	1	0.03
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0.00
		103		1.79	0.88	0	0	0	0	0	0	0.00
			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0.00
	Values and Ethics	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0.00
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0.00
		108		1.58	0.83	0	0	0	0	0	0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0.00
					Sum	0	0	0	0	0		
					Average		0.00		0.00			
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Understanding Earth's Shape	Geoids	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Tessellated Referencing Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Geometric Accuracy	Thematic Accuracy	Resolution	Precision	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Land Records	Global Positioning System
	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural	4	patterns of land use and built form	2.43	0.76	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cysterns	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem —solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dublic Doliny and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	0	0	1	0	0
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Understanding Earth's Shape		Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems		Linear Referencing Systems	1	Vertical Datum's	Map Projection Properties		Map Projection Parameters	Georegistration	Geometric Accuracy	Thematic Accuracy	Resolution		Primary & Secondary Sources	Survey Theory & Electro-optical Methods		Global Positioning System
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Design, Planning, and Management at	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COM ETENOLEG		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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					Sum	4	0	2	4	4	2	2	0	2	2		4	2	2	2	0	2	4	0	2	1	0	0
					Average	0.04	0.00	0.02	U.U4	U.U4	0.02	0.02	0.00	0.02	0.02	0.02	0.04	0.02	0.02	0.02	U.UU	0.02	U.U4	U.UU	0.02	0.01	0.00	0.00

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	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		4 0	1.09
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	).00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	0.00
	Natural and Cultural	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3 (	).06
	Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0	
	2,0100	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0	).OC
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0	).00
		8	creativity and process including design theory and problem —solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0	).00
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0	).0
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	).00
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	).00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	).00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	).00
	Dublic Deliev and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2 (	).04
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ĺ	0 0	0.0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0	).00

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		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	ç	Ç
		22	visual resource assessment	1.91	0.88	1	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0		į
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	(	1
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ĺ
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ĺ
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ĺ
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		ſ
	Materials, Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Technologies	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		(
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

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		storage, testing, e		1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		activities	esign, approval, permitting, and construction	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		51 the life-cycle co	ost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction Documentation	52 geographic coord conventions	dinate systems and layout techniques and	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	17	0.36
	and Administration	53 specification type	es and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			olemental conditions, special provisions, and eations and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		55 construction adm	ninistration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		56 basic constructi	ion law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		57 construction co	ntracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE STATEMENTS		58 determination of	user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS		59 consensus and	team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	the roles of visua video documenta	Il communication, including photographic and tion	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
			tion techniques, systems and symbols	2.71	0.73	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17	7 0.36
		63 interpretive methor and brochures	ods and techniques such as information displays	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		64 public relations, of	outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		65 environmental e	ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		66 social responsib	bility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Values and Ethics in Practice	principles and lar	anagement principles such as leadership ndscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		68 resolving moral	and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Tablet Digitizing	On-Screen Digitizing	Scanning & Automated Vectorization	Sample Size Selection	Spatial Sample Types	Sample Intervals	Field Data Technologies	Nature of Aerial Imagery Data	Platforms & Sensors	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Mission Planning	Nature of Multispectral Image Data	Platforms & Sensors	Algorithms & Processing	Ground Verification & Accuracy Assessment	Applications & Settings	Metadata	Content Standards	Data Warehouses	Exchange Specifications	Transport Protocols	Spatial Data Infrastructures	Sum	Average
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES	Design, Planning, and Management at	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies		Standard Deviation	Tablet Digitizing	On-Screen Digitizing	Scanning & Automated Vectorization	Sample Size Selection	Spatial Sample Types	Sample Intervals	Field Data Technologies	Nature of Aerial Imagery Data	Platforms & Sensors	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Mission Planning	Nature of Multispectral Image Data	Platforms & Sensors	Algorithms & Processing	Ground Verification & Accuracy Assessment	Applications & Settings	Metadata	Content Standards	Data Warehouses	Exchange Specifications	Transport Protocols	Spatial Data Infrastructures	en de	Average
		Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	С	0.00
		Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		92 Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	С	0.00
	Construction Documentation and	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Administration	94 Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		95 Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	0.00
		96 Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	0 0.00 0 0.00 0 0.00
		Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	С	0.00
		Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	0.00
COMPETENCIES		Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	0.00
COMPLICIO		100 Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.02
	Communication	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	С	0.00
		102 Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		103 Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		104 Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		105 Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	С	0.00
	Values and Ethics	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	in Practice	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		108 Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		109 Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		110 Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	С	0.00
				Sum Average	0.02		0.02	0.00	0.01	0.00	0.00	0.02	0.00	0.02	0.01	1 0.01	0.00	2 0.02	1 0.01	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.02		-

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies			Standard Deviation	The Legal Regime	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Agency, Organizational, & Individual Perspectives	Measuring Costs	Uses of Geospatial Information in Government	Public Participation in Governing	Public Participation GIS	
	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	
	Natural and Cultural	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	
	Systems		natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	
	.,	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	
	Wethodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	
	Dublic Delicon	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	1	1	0	0	0	0	0	1	0	0	
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	1	0	0	0	0	0	1	0	0	
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	1	0	0	0	0	1	0	0	
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	1	0	0	0	1	0	0	

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Legal Regime	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Agency, Organizational, & Individual Perspectives	Measuring Costs	Uses of Geospatial Information in Government	Public Participation in Governing	Public Participation GIS
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0
		24		2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0
	and	26		2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0
	Management at		historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28		2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29		1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		30		1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		31		1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0
		36		2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,		sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies		construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications		grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0
			biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	1	0	0
			Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Legal Regime	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Agency, Organizational, & Individual Perspectives	Measuring Costs	Uses of Geospatial Information in Government	Public Participation in Governing	Public Participation GIS
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	1	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS			ů –	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0
		60		1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	1	0	0	0	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	1
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	1	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0

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		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	1	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	1	0	0
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	1	0	0	0	0	0	0	0	0	1	0

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		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0
	Administration	94	Conduct project closure including review and distribution of close out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0
			Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0
			Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Legal Regime	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Agency, Organizational, & Individual Perspectives	Measuring Costs	Uses of Geospatial Information in Government	Public Participation in Governing	Public Participation GIS
		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	1	0	0	0	0	0	0	0	0	0
	Values and Ethics in	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Values and Ethics in Practice	107		1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0
			Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	0	1	3	2	1	2	2	0	0	7	1	2
					Average	0.00	0.01	0.03	0.02	0.01	0.02	0.02	0.00	0.00	0.06	0.01	0.02

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Property Regimes	Mechanisms of Control of Geospatial Information	Enforcing Control	Incentives & Barriers to Sharing Geospatial Information	Data Sharing Among Organizations & Individuals	Legal Mechanisms for Sharing Geospatial Information	Balancing Security & open Access to Geospatial Information	Ethics & Geospatial Information	Codes of Ethics for Geospatial Professionals	Epistemological Critiques	Ethical Critiques	Feminist Critiques	Social Critiques	Sum	Average
	Landscape Architecture History	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural and Cultural	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Oystems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.04
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0		0.12
		18		1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0.08
	Regulation		land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0.08
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.08

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Property Regimes	Mechanisms of Control of Geospatial Information	Enforcing Control	Incentives & Barriers to Sharing Geospatial Information	Data Sharing Among Organizations & Individuals	Legal Mechanisms for Sharing Geospatial Information	Balancing Security & open Access to Geospatial Information	Ethics & Geospatial Information	Codes of Ethics for Geospatial Professionals	Epistemological Critiques	Ethical Critiques	Feminist Critiques	Social Critiques	Sum	Average
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		23		1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		24	urban landscape planning principles including regional community and	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design, Planning	25	neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Materials, Methods,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies		construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0			0.00
	and Applications	42		2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	''	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0		0.04
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.04
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		56	basic construction law	1.48	0.84	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.04
		57	construction contracts	1.55	0.88	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.04
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
STATEMENTS		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0		0.08
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.04
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0		0.04
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.04
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.04
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.04

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		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.04
COMPETENCIES		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0.08
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	 1	0.04
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.08

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		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design, Planning, and Management at	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	, ipp.::ea.ie.ie	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Engineering: Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies and Applications	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		96 97	Perform construction services including design-build Prepare management and maintenance manuals and	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		98	documents  Maintain clear communication among collaborators through	0.81 1.51	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		99	correspondence and project coordination  Develop written documentation, such as projects reports, grant	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			proposals, and promotional materials  Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Property Regimes	Mechanisms of Control of Geospatial Information	Enforcing Control	Incentives & Barriers to Sharing Geospatial Information	Data Sharing Among Organizations & Individuals	Legal Mechanisms for Sharing Geospatial Information	Balancing Security & open Access to Geospatial Information	Ethics & Geospatial Information	Codes of Ethics for Geospatial Professionals	Epistemological Critiques	Ethical Critiques	Feminist Critiques	Social Critiques	Sum	Average
		104	Manage business practices and organizations	0.81	0.74	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.04
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.04
	Values and Ethics in	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES	Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
			Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	1	0	0	0	0	0	0	0	0		0.04
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.04
					Sum	0	2	2	0	2	1	0	3	0	0	0	0	0		
					Average	0.00	0.02	0.02	0.00	0.02	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00		

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	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	1	0	0	0	1	0	1	1	1	1	0	0	0	0	0
	Public Policy	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Regulation	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Public Sector Origins	Private Sector Origins	Academic Origins	Learning from Experience	ш	Managing the GI System Operations & Infrastructure	Ongoing GI System Revisions	Budgeting for GI System Management		System Management	User Support	Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders		GIS&T Staff Development	Ö	GIS&T Training & Education	Incorporating GIS&T into Existing Job Classifications
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design,	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planning and	26	conservation of natural resources	2.33	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction	51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Administration	54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	Design,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planning, and Management at	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods, Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction	92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Documentation	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build Prepare management and maintenance manuals and	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media  Prepare and deliver oral presentations such as meetings,	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	101	demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Public Sector Origins	Private Sector Origins	Academic Origins	Learning from Experience	Future Trends	Managing the GI System Operations & Infrastructure	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders	Integrating GIS&T with Management Information Systems (MIS)	GIS&T Staff Development	GIS&T Positions & Qualifications	GIS&T Training & Education	Incorporating GIS&T into Existing Job Classifications
		104 Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105 Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Ethics in Practice	continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		108 Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109 Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110 Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Sum	0	0	0	1	0	0	2	3	1	1	1	1	1	0	0	0	1	0
				Average	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry	Sum	Average
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0.06
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Cultural	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		8	creativity and process including design theory and problem —solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design and Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0.13
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	1	0	0	0	0	0	0	1	0	8	0.25
	Public Policy	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Regulation	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and itegulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adop	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & Internationa Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry	Sum	Average
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design,	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Planning and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Management at		historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales	28	ecological planning principles	2.23	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications		Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Engineering:	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Materials,	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Methods,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry	Sum	Average
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction	51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Administration	53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Auministration	54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
KNOWLEDGE STATEMENTS		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
STATEMENTS			consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.06
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Values and	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Ethics in Practice		organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry	Sum	Average
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.03
COMPETENCIES		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural &	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Cultural Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Public Policy	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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	Design,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Planning, and Management at	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Various Scales and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
COMPETENCIES		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Construction	92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Administration	94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		96 97	Perform construction services including design-build Prepare management and maintenance manuals and	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		98	documents  Maintain clear communication among collaborators through	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.00
		99	correspondence and project coordination  Develop written documentation, such as projects reports, grant	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		100	proposals, and promotional materials  Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

			LABOK									GIS	&T BO	K								
				Knowled	nmand of dge at time of egree					OI5	Organiza	tional &	Institu	tional Aspect	S	Ol6						
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry		Sum	Average
		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
COMPETENCIES	Ethics in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
			Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	1	0	0	0	0	0	0	0	0	0	0		1	0.03
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					_														<u> </u>	<b></b>		
					Sum	1	0	0	3	0	11	0	0	1	0	1	0	1	0			
					Average	0.01	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00			

## **Appendix F - Matrix Analysis (1b)**

Competency Division  La Arri Hi C  Na Cultu  Na Cultu  Na F The Mett STATEMENTS	Domains  Landscape Architecture History and Criticism  Natural and Iltural Systems  Design and Planning Theories and lethodologies	2 3 4 5 6 7 8 9 10 11	knowledge Statements / Competencies  history of landscape architecture and allied professions historic preservation principles land information sources patterns of land use and built form natural site conditions and ecosystems social and cultural influences on design  regional hazard design considerations  creativity and process including design theory and problem -solving strategies  aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	Knowle	mand of ordge at time Degree Standard Deviation 0.69 0.83 0.77 0.76 0.66 0.81 0.87 0.71 0.76 0.64 0.71 0.76 0.75 0.79	AM Sum 0 1 3 26 20 4 5 4 8 5 19	6 3 2 2 4 2 0 1 1 2 2 2	GIS CV Sum 2 0 0 0 0 0 0 0 0 1 1 2 0 0 0	DA Sum 0 0 0 0 1 1 0 3 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 1 0 0 0	GC Sum 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0	GD Sum 4 0 0 3 0 0 0 0 0 0 0	GS Sum 0 0 0 0 0 0 0 0 0 0	OI   Sum   2   0   0   0   0   0   0   0   0   0	Statements and Competency (Horizontal) Sum  14  4  5  33  25  7
Competency Division  La Arri Hi C  Na Cultu  Na Cultu  Na F The Mett STATEMENTS	Landscape Architecture History and Criticism  Natural and Iltural Systems  Design and Planning Theories and	2 3 4 5 6 7 8 9 10 11	history of landscape architecture and allied professions historic preservation principles land information sources patterns of land use and built form natural site conditions and ecosystems social and cultural influences on design regional hazard design considerations  creativity and process including design theory and problem solving strategies aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.15 1.69 2.55 2.43 2.76 2.19 2.1 2.83 2.78 2.33 2.53	Deviation  0.69  0.83  0.77  0.76  0.66  0.81  0.87  0.64  0.71  0.76  0.75	0 1 3 26 20 4 5	6 3 2 2 4 2 0 0 2 1 2	2 0 0 0 0 0 0	0 0 0 0 0 1 1	0 0 0 0 0 0 0 0	0 0 0 1 0 0 0	0 0 0 1 1 0	9 Sum 4 0 0 3 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	Sum 2 0 0 0 0 0 0 0	(Horizontal) Sum 14 4 5 33 25 7
Na Cultu  Na Cultu  Na Cultu  Na Cultu  Publi	Architecture History and Criticism  Natural and Iltural Systems  Design and Planning Theories and	2 3 4 5 6 7 8 9 10 11	historic preservation principles land information sources patterns of land use and built form natural site conditions and ecosystems social and cultural influences on design regional hazard design considerations  creativity and process including design theory and problem—solving strategies aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.55 2.43 2.76 2.19 2.1 2.83 2.78 2.33 2.53	0.83 0.77 0.76 0.66 0.81 0.87 0.64 0.71 0.76 0.75	1 3 26 20 4 5	3 2 2 4 2 0 2	0 0 0 0 0 0	0 0 0 0 1 1 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 1 0 0 0	0 0 1 1 0 0	0 0 3 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0	4 5 33 25 7 5
Na Cultu  De F The Mett STATEMENTS	Criticism  Natural and litural Systems  Design and Planning Theories and	3 4 5 6 7 8 9 10 11	land information sources patterns of land use and built form natural site conditions and ecosystems social and cultural influences on design regional hazard design considerations  creativity and process including design theory and problem—solving strategies  aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.55 2.43 2.76 2.19 2.1 2.83 2.78 2.33 2.53	0.77 0.76 0.66 0.81 0.87 0.64 0.71 0.76	3 26 20 4 5 4 8	2 2 4 2 0 2	0 0 0 0 0	0 0 0 1 0 3 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 1 0 0 0	0 1 1 0 0	0 3 0 0 0 0 0 0 0	0 0 0 0	0 0 0 0	5 33 25 7 5
KNOWLEDGE STATEMENTS  Culture  Publice  Publice	Design and Planning	4 5 6 7 8 9 10 11 12	patterns of land use and built form natural site conditions and ecosystems social and cultural influences on design regional hazard design considerations creativity and process including design theory and problem—solving strategies aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.43 2.76 2.19 2.1 2.83 2.78 2.33 2.53	0.76 0.66 0.81 0.87 0.64 0.71 0.76 0.75	26 20 4 5 4 8 5	2 4 2 0 2 1 2	0 0 0 0	0 0 1 0 3 0 0	0 0 0 0 0 0 0	1 0 0 0	1 1 0 0	3 0 0 0	0 0 0	0 0 0	33 25 7 5
KNOWLEDGE STATEMENTS  Culture  Publice  Publice	Design and Planning	5 6 7 8 9 10 11	natural site conditions and ecosystems social and cultural influences on design regional hazard design considerations  creativity and process including design theory and problem—solving strategies  aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.76 2.19 2.1 2.83 2.78 2.33 2.53	0.66 0.81 0.87 0.64 0.71 0.76 0.75	20 4 5 4 8 5	4 2 0 2 1 2	0 0 0 1 2	0 1 0 3 0 0	0 0 0 0 0 0	0 0 0 0 0	1 0 0	0 0 0 0	0 0 0	0 0 0	25 7 5
Cultu  De F The Meti STATEMENTS  Publi	Design and Planning	6 7 8 9 10 11 12	social and cultural influences on design  regional hazard design considerations  creativity and process including design theory and problem –solving strategies  aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.19 2.83 2.78 2.33 2.53	0.81 0.87 0.64 0.71 0.76 0.75	4 5 4 8 5	2 0 2 1 2	0 0 1 2	1 0 3 0	0 0 0 0 0	0 0 0 0	0 0 1 0	0 0 0	0 0	0 0	7 5
Cultu  De F The Meti STATEMENTS  Publi	Design and Planning	7 8 9 10 11	regional hazard design considerations  creativity and process including design theory and problem—solving strategies  aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.1 2.83 2.78 2.33 2.53	0.87 0.64 0.71 0.76 0.75	5 4 8 5	0 2 1 2	0 0 1 2	0 3 0	0 0 0 0	0 0 0	0 1 0	0 0	0	0	5
KNOWLEDGE STATEMENTS	Design and Planning Theories and	8 9 10 11 12	creativity and process including design theory and problem —solving strategies  aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.83 2.78 2.33 2.53	0.64 0.71 0.76 0.75	4 8 5	2 1 2	0 1 2	3 0	0 0 0	0 0	1 0	0	0	0	10
KNOWLEDGE STATEMENTS F	Planning Theories and	9 10 11 12	aesthetic principles of design sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.78 2.33 2.53	0.71 0.76 0.75	8	1 2	1 2	0	0	0	0	0			
KNOWLEDGE STATEMENTS F	Planning Theories and	10 11 12	sensory response natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.33 2.53	0.76 0.75	5	2	2	0	0	0			0	0	10
KNOWLEDGE STATEMENTS F	Planning Theories and	11	natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.53	0.75							0				10
KNOWLEDGE STATEMENTS F	Planning Theories and	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology			19	2	0	0				0	0	0	9
KNOWLEDGE STATEMENTS F	Planning Theories and		resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79			_	U	0	1	1	0	0	0	23
KNOWLEDGE STATEMENTS	ietnodologies					15	3	0	0	0	1	0	0	0	0	19
Publi		13	influence of context on design, planning, and management decisions	2.45	0.76	12	1	0	0	0	1	0	0	0	0	14
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	7	3	2	0	0	3	0	0	0	4	19
		15	therapeutic aspects of design	1.66	0.88	2	1	0	0	0	0	0	0	0	0	3
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	4	1	5	3	0	2	0	0	1	8	24
	blic Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	1	0	1	0	1	0	2	3	0	9
	Regulation		political and regulatory approval processes	1.67	0.92	0	1	0	1	0	0	0	0	2	0	4
	-	19 20	land and development economics emerging trends and issues	1.47 1.65	0.83	5	2	0	0	0	0	0	0	2	0	8
<u> </u>		21	photogrammetry and remote sensing	1.00	0.84	10	1	6	1	0	3	0	9	0	0	30
	ŀ	22	visual resource assessment	1.91	0.88	12	2	14	0	0	4	2	8	0	0	42
	ŀ	23	agricultural and rural landscape analysis	1.68	0.85	15	1	2	1	0	0	1	0	0	0	20
	ļ	24	urban landscape	2.17	0.71	13	1	1	0	0	0	0	0	0	0	15
Desig	sign, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	10	0	1	0	0	1	0	0	0	0	12
	and	26	conservation of natural resources	2.33	0.8	13	2	0	0	0	0	0	0	0	0	15
	anagement at	27	historic preservation	1.73	0.76	1	3	0	0	0	0	0	0	0	0	4
	arious Scales	28	ecological planning principles	2.23	0.8	8	2	0	0	0	0	0	0	0	0	10
and A	d Applications	29 30	Water resource management wetland	1.91	0.84	7	3	0	0	0	0	0	0	0	0	10 14
	}	31	floodplain management	1.78 1.8	0.83	13	2	0	0	0	0	0	0	0	0	15
	I	32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	6	2	0	0	0	0	0	0	0	0	8
				1.05		1	1	0	0	0	0	0	0	0	0	

			LABOK													Knowledge
Knowledge Statement /	Domains		Knowledge Statements / Competencies	Knowle	nmand of edge at time Degree			GIS	S&T B	OK Kr	nowled	dge Ar	eas			Statements and Competency
Competency Division	Domano		Talomoago otalomento, competendos	Mean	Standard Deviation		CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	(Horizontal) Sum
		34	design needs for special populations	1.91	0.78	1	1	0	0	0	0	0	0	0	0	2
		35	accessibility regulations	2.28	0.87	2	1	0	0	1	0	0	0	0	0	4
		36	roadway design principles	2.15	0.83	17	0	1	0	1	0	0	0	0	0	19
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	14	0	0	0	0	0	0	0	0	0	14
	Site Design and	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	1	0	0	0	0	0	0	0	0	0	1
	Engineering: Materials.	39	noise attenuation and mitigation techniques	1.66	0.82	2	0	0	0	0	0	0	0	0	0	2
	Methods,	40	sustainable construction practices	1.82	0.84	4	0	0	0	0	0	0	0	0	0	4
	Technologies	41	construction equipment and technologies	1.76	0.87	1	0	0	0	0	0	0	0	0	0	1
	and Applications	42	grading, drainage and stormwater treatment	2.78	0.57	10	0	2	0	0	0	0	0	0	0	12
	aa / ippiloations	43	biofiltration and other alternative drainage methods	1.91	0.84	4	0	1	0	0	0	1	0	0	0	6
		44	erosion and sedimentation control	2.28	0.82	6	0	1	0	0	0	0	0	0	0	7
		45	utility systems	1.77	0.77	9	0	1	0	0	0	1	0	1	0	12
		46 47	Irrigation systems	1.75 1.7	0.88	8	0	1	0	0	0	1	0	0	0	10 10
		48	structural considerations	2.06	0.79	3	0	1	0	0	0	0	0	0	0	4
			quality control procedures for construction, such as delivery,	2.00	0.02			•								
		49	sequencing of design, approval, permitting, and construction	1.27	0.87	3	0	0	0	0	0	0	0	0	0	3
		50	activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE	Construction	51	the life-cycle cost-analysis process geographic coordinate systems and layout techniques and	1.32	0.86	0	0	0	0	0	0	0	0	1	0	1
STATEMENTS	Documentation and	52	conventions	1.9	0.9	2	2	9	0	2	4	2	17	0	0	38
	Administration	53	specification types and components for a project general and supplemental conditions, special provisions, and	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0
		54	technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84 0.88	0	1	0	0	0	0	0	0	1	0	2
	1		construction contracts				1	0	0		0				0	
		58 59	determination of user values such as focus groups and surveys consensus and team building	1.52 1.74	0.83	0	0	1	0	0	0	0	0	0	0	0
			techniques for conducting meetings	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	3	0	14	1	4	0	1	1	2	0	26
		62	graphic presentation techniques, systems and symbols	2.71	0.73	6	1	16	4	4	1	3	17	1	2	55
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	3	1	2	0	0	0	0	0	0	0	6
		64	public relations, outreach, and image development	1.49	0.97	0	1	0	0	0	0	0	0	1	0	2
		65	environmental ethics	2.08	0.82	2	1	0	0	0	0	0	0	0	0	3
		66	social responsibility in design	2.1	0.78	0	1	0	0	0	0	0	0	1	0	2
	Values and Ethics in Practice		organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	1	0	1
		68	resolving moral and ethical dilemmas	1.89	0.93	0	1	0	0	0	0	0	0	1	0	2
	1	00	reserving meral and ethical dileminas	1.03	0.93	U		U	U	U	U	U	U		U	

			LABOK													Knowledge
Knowledge Statement /	Domains		Knowledge Statements / Competencies	Knowle	mand of dge at time Degree			GI	S&T B	OK Kr	nowled	lge Ar	eas			Statements and Competency
Competency Division			,	Mean	Standard Deviation	AM Sum	CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	(Horizontal) Sum
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	3	0	0	0	0	0	0	0	0	0	3
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	4	1	0	1	0	0	0	0	0	0	6
	Landscape Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	1	0	0	0	0	0	0	0	0	0	1
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	4	2	1	0	0	0	0	0	1	1	9
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	13	0	0	0	0	0	0	0	0	0	13
COMPETENCIES	Natural & Cultural		Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	9	1	0	0	0	0	0	0	0	0	10
	Ststems		Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	10	1	0	0	0	0	0	0	0	0	11
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	8	0	0	1	0	0	0	0	0	0	9
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	3	1	0	0	0	0	0	0	2	0	6
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	3	2	0	0	0	0	0	0	1	0	6
	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	2	1	0	0	0	0	0	0	0	0	3
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	2	2	0	0	0	1	0	0	2	0	7
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	2	0	0	0	0	0	0	0	0	0	2
	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	8	0	0	0	0	0	0	0	0	0	8
	and Applications	84	Develop conceptual design, planning, and management solutions	2.39	0.61	4	0	0	0	0	0	0	0	0	0	4
	дрикация	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	4	0	0	0	0	0	1	0	0	0	5

			LABOK													Knowledge
Knowledge Statement /	Domains		Knowledge Statements / Competencies	Knowle	nmand of edge at time Degree			GIS	S&T B	OK Kr	nowled	lge Ar	eas			Statements and Competency
Competency Division				Mean	Standard Deviation		CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	(Horizontal) Sum
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	15	3	1	0	0	0	0	0	0	0	19
	Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	11	2	1	0	0	0	0	0	0	0	14
	Methods, Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	12	0	1	0	1	0	0	0	0	0	14
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	2	0	1	0	0	0	0	0	0	0	3
		90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	1
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0
	Construction	92		0.72	0.7	0	0	0	0	0	0	0	0	0	0	0
	Documentation and	93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0
	Administration	94	Conduct project closure including review and distribution of close- out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0
		96		0.67	0.7	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	1	1
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0
		100		2.19	0.76	3	0	5	4	4	2	1	1	0	0	20
	Communication	101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	1	0	0	0	0	0	0	0	1
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0
			Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0
			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	1	0	1
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	1	0	1
	\/=l = = d	106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	1	1
			Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0
			Train, educate and mentor other professionals	0.96	0.91	0	0	0	2	0	0	0	0	1	1	4
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	1	0	1
			SUM GIS&T	Γ Knowl	L edge Areas	500	89	98	25	17	26	19	62	30	20	887
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		1		# G	IS&T topics	59	30	27	32	23	14	40	47	25	32	329

## Appendix G - Matrix Synthesis (1c)

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Competency	Domains		Knowledge Statements / Competencies			ŭ	pro	2uc	Je.	Fe	on	Φ	_	Si V	<u>ვ</u> : <u>E</u>		€	ود   و
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						Academic	λŧić	Structured Langu	Spatial	Distance				ži Ž	Connectivity			Neighborhoods Map Algebra
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	Landscape	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Architecture	1	Thetery of tandedape are interested and anied professions	2.10	0.00	Ľ		Ü	J	Ü	Ü	5	3	J	J	5	J	0
	History and	0	historia processation principles	4.00	0.00	_	_	_	_	_	_		0	4		0	_	
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	1	0	0	0	0 0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	1	0	1	1	1	1	0 0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	1	0	0	0	0	1	1	0 0
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	1	0	0	0	0 0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	1	1	0 0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	1	0	0 0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	1	1	1	1	0	0	1	0	0 1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	1	0			0 0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	1	1	0	1 1
	Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	1	0	1	0	1 0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	1	0	0	1	0	1	0	0 0
KNOWLEDGE		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	•	1	0	0 0
STATEMENTS		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	1	0	0	0	-			0 0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	0	0	0	0	0	0			0	0 0
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0			0 0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0			0 0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	1	0	0	0	1				0 0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0				0 0
		21	photogrammetry and remote sensing	1.47	0.84	0	1	0	1	0	1	1	0	0			0	0 0
		22	visual resource assessment	1.91	0.88	0	1	0	0	1	0	1	0	0		0		0 0
		23	agricultural and rural landscape analysis	1.68 2.17	0.85 0.71	0	1	0	0	0	0	1	0	0	0			0 0
	Design, Planning	25	urban landscape planning principles including regional community and neighborhood planning	2.17	0.71	0	0	0	0	1	0		0		-			1 1 0
	and	26		2.33	0.76	1	0	0	0	0	0	0	0	0	0			0 0
	Management at	27		1.73	0.76	0	0	0	0	0	0	0	0					0 0
	Various Scales	28		2.23	0.70	0	0	0	0	0	0	0	0	0	0			0 1
	and Applications	29		1.91	0.84	1	0	0	0	0	0	0	0	0				0 1
		30	·	1.78	0.83	0	0	0	0	0	0	0	0	0	0			0 1
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0			0 1
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0					0 1
			treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0		_	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	1	1	1	1	1	1	1	1	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	1	1	1	0	1	1	1	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	1	1	0	1	0	0	1	0	0	0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	and Applications	45	utility systems	1.77	0.77	0	0	0	1	1	1	0	0	1	0	0	1	0	1
		46	Irrigation systems	1.75	0.88	0	0	0	1	1	1	0	0	1	0	0	1	0	0
		47	lighting systems	1.7	0.79	0	0	0	1	1	1	0	0	1	0	0	1	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/1/0/4/1 50.05		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	1	1	0	0	0	0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		62		2.71	0.73	0	1	0	0	0	1	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0		0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0
	Values on a File	66		2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	1	1	0	0	0
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	1	0	1	0	0	0	0	0	0	1	0	0	1
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	1	0	1	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	1	0	0	0	1	0	0	0	0	0	0	0	0	0
	Public Policy and	79	, , , , , , , , , , , , , , , , , , , ,	1.37	0.81	0	0	0	0	1	0	0	0	1	0	0	0	0	0
COMPETENCIES	Regulation	80		0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Design, Planning,	81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	and Management	82 83		2.13	0.75 0.62	0	0	0	0	0	0	1	0	0	0	0	0	0	<u>0</u> 1
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.62	0	0	0	0	0	0	0	0	1	1	0	1	0	0
	and Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	1	0	0	0	1	1	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	1	0	0	0	0	0	1	1	1	0	1
	Engineering: Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	1	1	1	0	1
	Methods, Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	1	1	0	0	1	1	0	1	0	1
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Construction Documentation and Administration		Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	1	0	0	0	0	0	0	0	0	0

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	On more reliables	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		101		2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	107		1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Train, educate and mentor other professionals  Maintain and promote professional and ethical standards	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	International promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	U	0	0	0	0	0	0	U
					Sum	9	8	1	8	17	13	9	3	20	15	33	17	4	17
					Average	0.10	0.09	0.01	0.09	0.19	0.14	0.10	0.03	0.22	0.16	0.36	0.19	0.04	0.19

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							(i)				2	0)							>	—	+
	Landscape	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
	Architecture																			+	+
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
	Ondon								_	_								_			
		3		2.55	0.77	0	0	0	0	0	0	0	1	1	1	0	0	0	0 0		
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	1	1	0	0	1	1	1	1	0	1	1	0 0		1
	Cultural Systems	5	natural site conditions and ecosystems social and cultural influences on design	2.76	0.66	0	0	<u>1</u> 1	1	0	1	1	7	1	1	0	1	1	1 0		1
		<u>6</u> 7	regional hazard design considerations	2.19 2.1	0.81 0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	1	0	0	0	0	0	0	0	0	0 0		
		9	aesthetic principles of design	2.78	0.04	0	0	0	0	0	0	1	1	0	0	0	0	0	0 0		0
		10	human factors such as behavior, perception, psychological and sensory response	2.73	0.76	0	0	0	0	0	0	1	1	0	0	0	0	0	0 0		
		11	natural factors such as ecological relationships	2.53	0.75	0	1	1	0	0	0	1	1	1	1	0	0	1	0 0		1
	Design and		relationship between human and natural systems such as resource conservation, habitat restoration and					-							-						-
	Planning Theories and Methodologies	12	creation, and urban ecology	2.36	0.79	0	0	1	1	0	0	1	1	0	0	0	0	1	1 0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	1	0	0	0	1	1	0	0	0	0	1	1 0	0	0
KNOWLEDGE		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	1	0	0	0	1	1	0 0		
STATEMENTS		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		
OT/(TEIMEINTO		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	1	0	0 0		0
	D tr. D r	17		1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		
	Public Policy and	18		1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		
	Regulation	19		1.47	0.83	0	0	0	0	0	0	0	1	0	0	1	0	0	0 0		
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		
		21	photogrammetry and remote sensing	1.47	0.84 0.88	0	0	0	1	0	0	0	0	0	0	1	0	0	0 0		1
		22	visual resource assessment agricultural and rural landscape analysis	1.91 1.68	0.88	0	0	<u>0</u>	0	1	0	0	1	1	0	1	1	0	0 0		1
		24	urban landscape  urban landscape	2.17	0.85	1	0	1	0	0	0	1	1	<u> </u>	0	<u> </u>	0	0	0 0		
	Design, Planning	25		2.17	0.76	0	0	1	0	0	1	0	1	1	0	0	0	0	0 0		
	and	26		2.33	0.70	0	0	1	0	1	1	0	1	1	1	1	0	0	0 0		1
	Management at		historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	1	0	0	0	0	0 0		0
	Various Scales		ecological planning principles	2.23	0.8	0	0	1	0	1	1	0	1	1	1	0	0	0	0 0		
	and Applications		Water resource management	1.91	0.84	0	0	1	0	0	1	0	1	1	1	0	0	0	0 0	_	
		30		1.78	0.83	0	0	1	0	0	1	0	1	1	1	0	0	1	0 0		1
		31		1.8	0.86	0	0	1	0	0	1	0	1	1	1	0	0	1	0 0		1
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	1	0	0	0	0	1	1	1	0	0	1	0 0		0
			treatment of toxic materials	1.05	0.86	0	0	1	0	0	1	0	1	1	0	0	0	0	0 0		

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies			Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semi- variogram Construction Semi-variogram	Modeling Principles of Kriging	Kriging Variants
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	1	0	0	0	0	0	0 0		
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		_
		36	roadway design principles	2.15	0.83	0	0	1	0	0	0	0	1	1	1	0	0	0	0 0		
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	1	0	0	0	0	1	1	0	0	0	0	0 0		
	Site Design and Engineering: Materials, Methods,	38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	1	0	0	0	0	0	0 0		_
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	1	0	0	0	0	0	0	0	0	0	0	0 0		
		40		1.82	0.84	0	0	0	0	0	0	0	1	1	0	1	0	0	0 0		
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0		
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	1	1	1	1	0	0	0 0		
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	1	1	1	0	0	0	0 0		
	and Applications	44		2.28	0.82	0	0	0	0	0	0	0	1	1	1	0	0	0	0 0		_
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	1	1	0	0	0	0	0 0		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
		46	Irrigation systems	1.75	0.88 0.79	0	0	0	0	0	0	0	1	1	0	0	0	0	0 0		
		48	structural considerations	2.06	0.79	0	0	0	0	0	0	0	1	1	0	1	0	0	0 0		
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	1	0	0	0 0	0	0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0 0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0		0	1	1	1	0 0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	1	1	0 0	0	0
			public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
			environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	1	1	0	0	0 0	0	0
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
	in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies			Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semi- variogram Construction		Principles of Kriging Kriging Variants
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Landscape Architecture History & Criticism	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0 0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0 0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0 0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0 0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	1	0	0	1	0	1	1	1	1	1	0	0	0	0 0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	1	0	0	1	0	1	1	1	1	1	1	0	0	0 0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0 0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0 0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0 0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	1	0	0	0	0	0	0		0 0
	Design, Planning,	82		2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0 0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	1	0	0	0	0	1	0	0	0	1	0	0		0 0
	at Various Scales and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	1	0	0	0	0	0	0		0 0
	Applications  Site Design and Engineering: Materials, Methods, Technologies and Applications	85	Evaluate design alternatives to determine the appropriate solution  Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and	2.45	0.59	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0 0
		86	sedimentation control)	2.13	0.64	0	0	1	0	0	1	0	1	1		1	0	1	0		0 0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	1	0	0	0	0	1	0	1	1	0	1	0	-	0 0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0 0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0 0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation		Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semivariogram Construction Semi-variogram	Modeling Principles of Kriging	a
	O	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	1	0	0 (	0 0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0
COMPETENCIES		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0
	in Practice		Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (		
			Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (		
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0
		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0
	Notional and	4	patterns of land use and built form	2.43	0.76	0	1	1	1	0	1	1	1	1
	Natural and	5	natural site conditions and ecosystems	2.76	0.66	0	1	1	1	0	0	0	1	0
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	1	0	1	0
		7	regional hazard design considerations	2.1	0.87	0	1	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	1	0	0	0	0	0	0	1	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	1	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	0	1	1	1	0	0	1	1	0
	Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	1	1	0	0	1	1	1
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	1	0	1	1
KNOW! FDOE		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	1	0	0	0	0
KNOWLEDGE		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	1	0	0	0	1
		22	visual resource assessment	1.91	0.88	0	0	0	0	1	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	1	0	0	0	0
			urban landscape	2.17	0.71	0	0	0	0	0	1	0	0	0
	Design, Planning		planning principles including regional community and neighborhood planning	2.12	0.76	0	0	1	1	0	0	0	0	0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0
	Management at		historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0
	and Applications		Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	1	1	1	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	1	1	1	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
			design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	1	0
		36	roadway design principles	2.15	0.83	0	0	1	1	0	1	1	1	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	1	1	0	1	1	1	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	1	1	0	0	0	0	0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	1	0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	1	1	0	0	0	0	0
	''		utility systems	1.77	0.77	0	0	0	0	0	0	1	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	1	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	1	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	1	0	0	0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	1	0	0	0	0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	1	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	1	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	1	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0
	in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	1	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	1	1	1	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	1	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	1	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	1	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	1	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	1	1	0
	at Various Scales and	84 85	Develop conceptual design, planning, and management solutions  Evaluate design alternatives to determine the appropriate solution	2.39 2.45	0.61 0.59	0	0	0	0	0	0	0	0	0
	Applications Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	1	1	0	0	0	1	0
	Engineering: Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	1	1	0	0	0	0	0
	Methods,	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	1	1	0	1	0	1	0
	Technologies and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems		Operations Research Modeling & Location Modeling Principles
	0	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	1	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0
COMPETENCIES			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0
	in Practice		Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0
	III I Idolloc	109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0
					Sum	4	10	15	15	9	8	9	16	4
					Average	0.04	0.11	0.16	0.16	0.10	0.09	0.10	J.18	0.04

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	1	0	1	0	1	0	1	0	0	1	0	0	0	0	1
	History and Criticism		historic preservation principles	1.69	0.83	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0
			land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
	Natural and		patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
	Cultural Systems		natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0
	Cultural Cyclemic		social and cultural influences on design	2.19	0.81	0	0	0	0	1	0	0	0	0	0	0	0	0	1'	0
			regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
			aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
			human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
	Design and Planning Theories	12	natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and	2.53 2.36	0.75 0.79	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0
	and Methodologies		creation, and urban ecology	0.45		_	0	0	0		0	_	0	_	_	0	4			
	, and the second	13		2.45 2.37	0.76 0.93	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
KNOWLEDGE		14 15	research methods including data collection, interpretation, and application of results therapeutic aspects of design	1.66	0.93	0	1	0	-	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
			governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Public Policy and		political and regulatory approval processes	1.67	0.83	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Regulation		land and development economics	1.47	0.83	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
			emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
			photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
			visual resource assessment	1.91	0.88	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
			agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
			urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and		conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
	Management at	27	historic preservation	1.73	0.76	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
	and Applications	29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0
			wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
			land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From	Place & Landscape	Common-sense Geographies	Cu	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
			design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		36		2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and		noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:		sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,		construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	in Practice		organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
	0	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0			0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0			0
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0			0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
										_	_					_				
					Sum	6	2	1	4	6	2	8	24	3	1	3	15	0	7	1
					Average	0.07	0.02	0.01	0.04	0.07	0.02	0.09	0.26	0.03	0.01	0.03	0.16	0.07 0	.08 0	.01

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Design Issue	Map Design Fundamentals	Symbolization Color for Cartography &	lization aphy for	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments Visualization of	Temporal Geographic Visualization of	Uncertainty Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	1	1	0	0	0	0 0	0 0	0	0	0	0	0	0 0	0	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0 0	0	0	0	0	0	0
		3		2.55	0.77	0	0		0	0	0 (			0	0			0 0			0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0		0	0		0 0		0	0	0		0 0			0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0		0	0		0 0		0	0	0		0 0			0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0			0	0	0 (	-		0	0			0 0			0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0		0	0		0 0	_	0	0	0		0 0			0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	_		0	0	0 (		_	0	0			0 0			0	0	0	0
		9	aesthetic principles of design	2.78	0.71 0.76	0	0		1	0		$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$		0	0	0		0 0			0	0	0	0
		11	human factors such as behavior, perception, psychological and sensory response natural factors such as ecological relationships	2.53	0.76	0			0	0		$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$		0	0	0		0 0	_		0	0	0	0
	Design and Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0		0	0	0 0		0	0	0	0		0 0		0	0	0	0	0
	and Methodologies	13		2.45	0.76	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0 0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1		0	0		0 0		0	0	0		0 0			0	0	0	0
KNOWLEDGE		15	therapeutic aspects of design	1.66	0.88	0	0		0	0		0 0	0	0	0	0		0 0			0	0	0	0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1		0	0		0 0		0	0	1		0 0		_	0	0	0	1
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0 0	0 0	0	0	0	0	0	0 0	0	0	0	0	0	0
	Public Policy and	18		1.67	0.92	0	0	0	0	0	0 (	0 0	0	0	0	0	0	0 0	0	0	0	0	0	0
	Regulation	19	land and development economics	1.47	0.83	0	0		0	0	0 (	0 0	0	0	0	0		0 0			0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0		0	0	0 0	0 0	0	0	0	0		0 0	0		0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84		1		0	0	-	1 0	0	0	0	0		0 0		0	0	1	1	0
		22	visual resource assessment	1.91	0.88	0	1		0	0	0 1	1 1	1	0	1	1	-	1 0	_	1	1	1	1	0
		23	agricultural and rural landscape analysis	1.68	0.85	0				1		0 0		0				0 0				1	0	0
		24	urban landscape	2.17	0.71	0			-	1		0 0		0		-	-		0			0	0	0
	Design, Planning			2.12	0.76	0	0		0	1		0 0		0	0	0		0 0		0	0	0	0	0
	and Management at	26		2.33	0.8	0			0	0		0 0		0	0			0 0		_	0	0	0	0
	Management at	27		1.73	0.76	0			0		0 0			0				0 0	_	_	0	0		0
	Various Scales and Applications	28		2.23	0.8	0			0	0		0 0	_	0				0 0	_	_	0	0	0	0
	and Applications	29 30		1.91 1.78	0.84 0.83	0			0	0		$\begin{array}{c c} 0 & 0 \\ 0 & 0 \end{array}$		0				0 0			0	0	0	0
		31	floodplain management	_		_			_											_	0			0
			land and water reclamation procedures including quarry, mine and landfill reclamation	1.8 1.43	0.86 0.84	0			0	0		$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$		0	0			0 0		_	0	0	0	0
		32		1.43		0	0		0	0		$\begin{array}{c c} 0 & 0 \\ 0 & 0 \end{array}$		0	0			0 0			0	0		0
	1	JJ	urealment of toxic materials	1.05	0.80	U	U	U	U	U	U	JU	U	U	U	U	U	υ   0	U	U	U	U	U	U

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	اعا	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	l ypography for Cartography & Basic Thematic Manaina	Meth	Multivariate Displays  Dynamic & Interactive	lay	Virtual & Immersive	Environments Visualization of	Temporal Geographic Visualization of	Uncertainty Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0					0 (	_	_	_	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0			0 (			_	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	1	0	0	0	0		_	0 (				0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0				0 (	_		_	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0				0 (	_		_	0	0	0	0	0
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0				0 (	_		_	0	0	0	0	0
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0			-	0 (	_		_	0	0	0	0	0
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0			0 (				_	0	0	0	0	0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0		0	0	1	0	0	0			_	1 (	_	_	_	0	0	0	0	0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	1	0	0	0				0 (	_			0	0	0	0	0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0		0	0	1	0	0	0				0 (	_		_	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	1	0	0	0			-	0 0	_	_	_	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	1	0	0	0				0 (				0	0	0	0	0
		48	lighting systems structural considerations	2.06	0.79	0	0	0	0	1	0	0	0			0 (	0 0				0	0	0	0	0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0 (	0 (	0 0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0 (	0 (	0 0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	1	1	0	1	1	1	1	1	1 (	0 0	0	0	0	0	0	0	1	0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0 (	0 (	0 0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0 (	0 (	0 0	0	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0 (	0 (	0 0	0	0	0	0	0	0	0	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	1	1	0	1	1	1	0 .	1	1 (	) 1	0	0	0	1	1	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	1	0	1	1			1 '	1	1 (	) 1	1	1	0	1	0	0	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	1 '	1 (	) C	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0		0	0	0	0 (	0 (	0 0	0	0	_	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0		0	0	0		0	0				0 0	_		0	0	0	0	0	0
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0 (	0 (	0 0	0	0	0	0	0	0	0	0
	in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0					0 0				0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0 (	0 (	0 (	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography &	Methods	Multivariate Displays  Dynamic & Interactive		Kepresenting Lerrain Virtual & Immersive	Environments Visualization of	Temporal Geographic Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis Evaluation & Testing
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	Landscape Architecture		Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0	0 0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0		0 (			0	0	0	0 (	0 0
	Public Policy and		Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0		0	0	0	0	0		0			0 (			0				0 0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines Influence public policies on areas such as growth and land and water management by testifying, lobbying, or	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0 (	0 C	0	0	0	0	0 (	0 0
		81	preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0 (	0   0	0	0	0	0	0 (	0 0
	Design, Planning,	82		2.13	0.75	0		0	0	0	0	0		0				0 0		0	0			0 0
	and Management at Various Scales	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0		0				0 0		0	0			0 0
	and	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0		0				0 0		0	0			0 0
	Applications	_	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	1	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0	0 0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	1	0	0	0	0				0 0		0	0	ŭ	-	0 0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	1	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	1	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 (	0 0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0 (	0 0	0	0	0	0	0 0	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization Color for Cartography &	Visualization Typography for	Cartography & Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic Visualization of	Uncertainty Map Production	Map Reproduction	Map Reading		Map Analysis Evaluation & Testing
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0 (	0 0	0	0	0	0	0	0 (	0	0	0	0	0 0
	Communication	100		2.19	0.76	0	0	1	1	1	0 (	0 0	0	0	0	1	0	0 (	0	1	0	0	0 0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0 (	0 0	0	0	0	0	0	0 (	0	1	0	0	0 0
COMPETENCIES		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0 (	0 0	0	0	0	0	0	0 (	0	0	0	0	0 0
	Values and Ethics	105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0 (	0 0		0	0	0	0	0 (	0	0	0	0	0 0
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0 (	0 0		0	0	0	0	0 (	) 0	0	0	0	0 0
		109	Train, educate and mentor other professionals  Maintain and promete professional and othical standards	0.96	0.91	0	0	0	0	0	0 (	0 0		0	0	0	0	0 (	) 0	0	0	0	0 0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	U	U	U	0 (	0 0	0	0	0	0	Ü	0 (	) 0	0	0	0	0 0
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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
	Landscape Architecture	1 history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History and Criticism	2 historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3 land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5 natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oditarai Oysteriis	social and cultural influences on design	2.19	0.81	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8 creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	1	1	1	0	0	0	0	0
		9 aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories	natural factors such as ecological relationships relationship between human and natural systems such as resource conservation, habitat restoration and	2.53	0.75 0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	creation, and urban ecology		0.70						_	_		_			0	0	
		influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	1	0	1	0	0	0	0	0	0	0	0
	Public Policy and	<ul> <li>governmental policies and laws that affect the use and development of land</li> <li>political and regulatory approval processes</li> </ul>	1.8 1.67	0.85 0.92	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Regulation	19 land and development economics	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	rtogulation	20 emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		21 photogrammetry and remote sensing	1.47	0.84	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		22 visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23 agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		24 urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	26 conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at	27 historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Various Scales	28 ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	29 Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30 wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31 floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32 land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33 treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User	Requirements Analysis		Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
		34 design needs for special populations	1.91	0.78	0	0	0		0	0	0	0	0	0	0	0	0	0
		35 accessibility regulations	2.28	0.87	0	0	0		0	0	0	0	0	0	0	0	0	0
		roadway design principles	2.15	0.83	0	0	0		0	0	0	0	0	0	0	0	0	0
		elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0		0	0	0	0	0	0	0	0	0	0
		38 landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0		0	0	0	0	0	0	0	0	0	0
	Site Design and	39 noise attenuation and mitigation techniques	1.66	0.82	0	0	0		0	0	0	0	0	0	0	0	0	0
	Engineering:	40 sustainable construction practices	1.82	0.84	0	0	0		0	0	0	0	0	0	0	0	0	0
	Materials,	41 construction equipment and technologies	1.76	0.87	0	0	0		0	0	0	0	0	0	0	0	0	0
	Methods,	42 grading, drainage and stormwater treatment	2.78	0.57	0	0	0		0	0	0	0	0	0	0	0	0	0
	Technologies	43 biofiltration and other alternative drainage methods	1.91	0.84	0	0	0		0	0	0	0	0	0	0	0	0	0
	and Applications	erosion and sedimentation control	2.28	0.82	0	0	0		0	0	0	0	0	0	0	0	0	0
		45 utility systems	1.77	0.77	0	0	0		0	0	0	0	0	0	0	0	0	0
		46 Irrigation systems	1.75	0.88	0	0	0		0	0	0	0	0	0	0	0	0	0
		47 lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48 structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOW! EDGE		49 quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS	O a saturation	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52 geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Administration	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		determination of user values such as focus groups and surveys	1.52	0.83	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Communication	61 the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		62 graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	1	1	1	0	0	0	0
		63 interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64 public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		65 environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	66 social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Regulation	80		0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82		2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management at Various Scales	83 84		2.33 2.39	0.62 0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	88		2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications	89	·	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Analytical Procedures Formalizing a Procedure	Design User Interfaces	Implementation Planning
	0	98 Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0 0	0
	Communication	100 Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	1	1	1	0	0	0 1	0
		Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0 0	0
COMPETENCIES		104 Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0		0 0	0
	Values and Ethics	105 Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0 0	0
	in Practice	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0		0 0	0
		Train, educate and mentor other professionals	0.96	0.91	1	1	0	0	0	0	0	0	0	0		0 0	0
		Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0 0	0
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	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History and														t								
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<sub>.</sub>		3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4		2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Natural and	5		2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
. Г		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	-	14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
KNOWLEDGE	Ī	15		1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
,		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ĺ		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ļ	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
	<u> </u>	22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0
	<u> </u>	23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Danies Blancis	24	·	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	25		2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	and Management at	26	conservation of natural resources historic preservation	2.33 1.73	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Management at Various Scales		ecological planning principles	2.23	0.76 0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications		Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	30		1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	}	31		1.78	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	}	32	<u> </u>	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
	}	33		1.05	0.86	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0

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		34		1.91	0.78	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	1	0	0	0		0	0	0	0	0	0	0
		36		2.15	0.83	0	0	0	0	0	0	1	0	0	0		0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
	0: 5 :	38	landscape maintenance techniques, materials, equipment, and practices	1.93 1.66	0.87 0.82	0	0	0	0	0	0	0	0	0	0	_	0	0	0	0	0	0	0
	Site Design and	39 40		1.82	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials,	41		1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	42		2.78	0.57	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
	Technologies	43		1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	44		2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	45		1.77	0.77	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication		the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	1	1	0	0	0	1	0			_	0		0	0	0
		62		2.71	0.73	0	0	1	0	1	1	0	0	1	0		1	0	0	0	0	0	0
		63		1.82	0.98	0	0	0	0	0	0	0	0	0	_	_	0	_	0	0	0	0	0
		64		1.49	0.97	0	0	0	0	0	0	0	0	0	0		0		0	0	0	0	0
		65		2.08	0.82	0	0	0		0	0	0	0	0	0	_	0		0	0	0	0	0
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	Geometric Primitives	The Topological Model	The Network Model	Linear Referencing	Modeling Three- dimensional Entities	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector	Raster Resembling	Coordinate Transformations	Scale & Generalization	Aggregation of Spatial Entities	Database Change
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83		2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	ometric Prin	The Topological Model	The Network Model	Linear Referencing Modeling Three-	dimensional Entities	Transformations Data Model & Format	Conversion	Vector-to-Raster &	Raster Resembling	Coordinate Transformations	Scale & Generalization	Aggregation of Spatial Entities	Database Change
	0	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0 (	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	1	1	0	0	0	1	0	0	1	0 (	) 1	1	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0
COMPETENCIES			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0 (		0	_	0	0	0	0
	in Practice		Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0 (		0	_	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0		0		0	0 (		0		0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0 (	) (	) 0	0	0	0	0	0
					Sum	3	1	1	1	2	2	3	1	3	4 3	3 3	3 3	2	1	3	6	1
					Average	0.03	0.01	0.01	0.01	0.02	0.02 0	.03 0.	.01 0	0.03	0.04 0.		0.0	3 0.02	2 0.01		0.07	0.01

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Pattern Recognition	Simulation Modeling	Conceptual Model of	Error	Problems of Currency, Source. & Scale	Inder S Sha	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	1	0	1	1	0	0	0	0	0
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3		2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	1	0	1	1	0	0	0	0	0
	Cultural Systems	5		2.76	0.66	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and	11		2.53	0.75	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0		0	0	0	1	1	0	0	0	0	0
	Public Policy and	18		1.67	0.92	0	0	0		0	0	0	0	0	0	0	0	0	0
	Regulation	19		1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	1	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	_	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0		0	0	0	0	0	0	0	0	0	0
	Design, Planning	25		2.12	0.76	0	0	0	_	0	0	0	0	0	0	0	0	0	0
	and	26		2.33	0.8	0	0	0		0	0	0	0	0	0	0	0	0	0
	Management at	27		1.73	0.76	0	0	0	_	0	0	0	0	0	0	0	0	0	0
	Various Scales	28		2.23	0.8	0	0	0		0	0	0	0	0	0	0	0	0	0
	and Applications	29		1.91	0.84	0	0	0		0	0	0	0	0	0	0	0	0	0
		30		1.78	0.83	0	0	0	_	0	0	0	0	0	0	0	0	0	0
		31		1.8	0.86	0	0	0		0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale	Inder S Sha	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36		2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IAIOWI EDOE		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	1	1	1	1	1	1	1	1	1	1	1
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	1	1	1	1	1	0	0	1	1	1	1	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics	66		2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale	¬ \	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82		2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83		2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales and	84 85		2.39 2.45	0.61 0.59	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Applications Site Design and	86	Evaluate design alternatives to determine the appropriate solution  Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering: Materials,	87	Sedimentation control)  Design for protection and management of water resources (e.g. sterm water water supply ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	88	Design for protection and management of water resources (e.g. storm water, water supply, ground water)  Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	Λ	0	0	0	0	0	0	0	0	0	0
	Technologies and Applications		Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration		Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale	History of Understanding Earth's Shape	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's
	O a management in a still a s	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		101		2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES			Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	in Practice	107		1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	6	5	4	2	2	4	2	4	4	2	2	2	2	2
					Average			0.04			0.04			0.04		0.02			).02

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Thematic Accuracy	Resolution Primary & Secondary	irces ory & E	optical Methods Tablet Digitizing	Scanning & Automated	Spatial Sample Types	Nature of Aerial Imagery	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata Spatial Data
	Landscape Architecture	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	0	0 1
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0 (	0	0	0	0	0	0	0	0	0	0 0
		3	land information sources	2.55	0.77	0	0	0	0	0				0	0	0		0	0		0	0 0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0			_	0	0	0		0	0		0	0 0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0				0	0	0		0	0		0	0 0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0		0 (			0	0		0	0		0	0 0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0			_	0	0	0	_	0	0		0	0 0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0				0	0	0	_	0	0	0	0	0 0
		9	aesthetic principles of design	2.78 2.33	0.71 0.76	0	0	0	0	0				0 0	0	0		0	0	0	0	0 0
		10 11	human factors such as behavior, perception, psychological and sensory response natural factors such as ecological relationships	2.53	0.76	0	0	0	0	0				0 0	0	0		0	0	0	0	0 0
	Design and Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0		0 (			0	0	0	0	0	0	0	0 0
	and Methodologies	13	,	2.45	0.76	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	0	0 0
	•	14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0				0		0		0	0		0	0 0
KNOWLEDGE	•	15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0				0	0	0		0	0		0	0 0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0		0 (		0	0	0		0	0	0	0	0 0
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0				0	0	0	_	0	0		0	0 0
	Public Policy and	18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0				0	0	0		0	0	0	0	0 0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	0	0 0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	0	0 0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	1	1 (	) (	0	0	1	1	1	1	1	1	0 0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0			) 1		0	1	1	0	0	1	0	0 0
	[	23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0			) (		0	0		0	0	0	0	0 0
		24	urban landscape	2.17	0.71	0	0	0	0	0	-			0		+ -		0	0	0	0	0 0
			planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0		0 (		0	0	0	0	0	0	0	0	0 0
	and	26	conservation of natural resources	2.33	0.8	0	0	0	0	0		-	_	0		0		0	0		0	0 0
		27	historic preservation	1.73	0.76	0	0	0	0	0			) (		_	0		0	0	0	0	0 0
			ecological planning principles	2.23	0.8	0	0	0	0	0			) (		0	0	_	0	0	0	0	0 0
	and Applications		Water resource management	1.91	0.84	0	0	0	0	0				0		0		0	0			0 0
			wetland	1.78	0.83	0	0	0	0	0		0 (	_		0	0	_	0	0	0	0	0 0
		31	floodplain management	1.8	0.86	0	0	0	0	0				0	0	0		0	0		0	0 0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0			) (		0			0	0			0 0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0 (	) (	0 0	0	0	0	0	0	0	0	0 0

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		34	design needs for special populations	1.91	0.78	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
		35	accessibility regulations	2.28	0.87	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
		36	roadway design principles	2.15	0.83	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0			0 0	_	0	0	0	0	0	0	0	0	0		0 0
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0			0 (	_	0	0	0	0	0	0	0	0	0		0 0
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0		0 (	0 (	_	0	0	0	0	0	0	0	0	0		0 0
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
	aa / .p	45	utility systems	1.77	0.77	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
		46	Irrigation systems	1.75	0.88	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
		47	lighting systems	1.7	0.79	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
		48	structural considerations	2.06	0.82	0	0	0	0 (	0 0		0	0	0	0	0	0	0	0	0	0	0 0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	1	1 0	0	1	0	0	0	0	0	0	0	0	0	1 1
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
		57	construction contracts	1.55	0.88	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0 (	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0 (	) 1	0	0	0	0	0	0	0	0	0	0	0	0 0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1		1 1		0	1	1	1	0	0	0	0	0		1 0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0		0 0		0	0	0	0	0	0	0	0	0		0 0
		64	public relations, outreach, and image development	1.49	0.97	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
		65	environmental ethics	2.08	0.82	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
	Values and Edition	66	social responsibility in design	2.1	0.78	0	0			0 0	_	0	0	0	0	0	0	0	0	0		0 0
	Values and Ethics in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0			0 0		0	0	0	0	0	0	0	0	0		0 0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0 (	0 0	0	0	0	0	0	0	0	0	0	0	0	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Thematic Accuracy	solution	Primary & Secondary Sources	Survey Theory & Electro- optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and	79		1.37	0.81	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
	at Various Scales and		Develop conceptual design, planning, and management solutions	2.39 2.45	0.61 0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Applications Site Design and	85 86	Evaluate design alternatives to determine the appropriate solution  Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and	2.45		0	0	0	_		_		_				_		_	0		0	_	
	Engineering:  Materials,	87	sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
	Methods,		Design for protection and management of water resources (e.g. storm water, water supply, ground water)						_				-							_				
	Technologies and Applications	88 89	•	2.28 1.94	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration		Design elements for construction considering materials, structural issues, and construction technologies  Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0

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	•	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0	0	0
	Communication		Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0	1	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0	0	0
COMPETENCIES		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0	0	0
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0		0
	in Practice		Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0		0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0		0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0 0	0	0	0	0	0 0	0	0	0	0	0
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	Landscape	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Architecture																
	History and Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Chilcism																
		3		2.55	0.77	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Natural and	4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Cultural Systems	5 6		2.76 2.19	0.66 0.81	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		7	regional hazard design considerations	2.19	0.87	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Design and	11		2.53	0.75	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0 0	0	0	0	0	0 0
KNOWLEDGE		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0 0	0	0	0	0	0 0
STATEMENTS		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0 0	0	0	0	0	0 0
STATEMENTS		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0 0	0	0	0	1	0 0
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	1	1	0	0	0	1 0	0	0	0	0	0 0
	Public Policy and	18		1.67	0.92	0	0	1	0	0	0	1 0	0	0	0	0	0 0
	Regulation	19	land and development economics	1.47	0.83	0	0	0	1	0	0	1 0	0	0	0	0	0 0
		20 21	emerging trends and issues	1.65 1.47	0.83 0.84	0	0	0	0	1	0	1 0	0	0	0	0	0 0
		22	photogrammetry and remote sensing visual resource assessment	1.47	0.84	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Design, Planning	25		2.12	0.76	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	and	26		2.33	0.8	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Management at	27		1.73	0.76	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	Various Scales	28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0 0	0	0	0	0	0 0
	and Applications	29		1.91	0.84	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		30		1.78	0.83	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		31	· · · · · · · · · · · · · · · · · · ·	1.8	0.86	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0 0	0	0	0	0	0 0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0 0	0	0	0	0	0 0

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		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	_		0	_	0 0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0			0 0		_	0 0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0			0 0			0 0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0			0 0			0 0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0		_	0 0			0 0
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0		_	0 (			0 0
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0			0 (			0 0
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0			0 (			0 0
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0			0 0			0 0
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0			0 0			0 0
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0			0 (		_	0 0
	and Applications	45	utility systems	1.77	0.77	0	0	0	0	0	0		_	0 (			0 0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0			0 0	_	_	0 0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0			0 (		_	0 0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0			0 (			0 0
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0 (	0	0	0 0
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	1	0	0	0	0 (	0	0	0 0
	Construction Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0 0	0	0	0 0
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0 (	) 1	0	0 0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0 0	) 1	0	0 0
		58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0 (	0	0	0 0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	1	0	0	1 (	0	0	0 0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	1	0	0	0 (	0	0	0 0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0 (	0	0	0 0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	1 (	0	0	0 0
		65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0 (	0 (	0	0 0
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	1	0	0	0	0	0	0	0 (	0	0	0 0
	in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0 0	0	0	0 1
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0 (	0	0	0 1

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Contract Law	Liability	Privacy	Economics & the role Information	Valuing & Measuring Benefits	Models of Benefits	Uses of Geospatial Information in	Public Participation Governing	Public Participation G	Mechanisms of Control of Geospatial Information	Enforcing Control	Data Sharing Among Organizations &	Legal Mechanisms for Sharing Geospatial Ethics & Geospatial Information
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Landscape	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Architecture History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	1 0
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0 0
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	1	0	0	1	0	0	0 0
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	1	0	0	0	0	0	0 0
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Danisa Blancias	81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	1	0	0	0	0	0	0	1	0	0	0	0	0 0
	Design, Planning,	82		2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	and Management at Various Scales	83 84		2.33	0.62 0.61	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	and Applications	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Site Design and	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Engineering: Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Methods,	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Technologies and Applications		Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0 0
	Construction Documentation and Administration		Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Contract Law	Liability	Privacy	Economics & the role of Information	valuing & iviedsuming Benefits	Models of Benefits	Uses of Geospatial Information in	Public Participation in Governing	Public Participation GIS	Mechanisms of Control of Geospatial Information	Enforcing Control	Data Snaring Among Organizations &	Sharing Geospatial Ethics & Geospatial	Information
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0 0	)
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0 0	)
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0 0	)
COMPETENCIES		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	1	0	0	0 0	)
	Values and Ethics	105	Manage risk and liability	0.86	0.81	0	1	0	0	0	0	0	0	0	0	0	0	0 0	)
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0 0	)
	III FIACIICE	109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	1	0 0	)
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0 1	i
					Sum	1	3	2	1	2	2	7	1	2	2	2	2	1 3	3
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	Landscape	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0 0	0	0	0 0	1	1	0	14
	Architecture History and																		
	Criticism	2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	4
	2	_	land information courses	2.55	0.77			0	0	0	0	0 0		0	0 0	0	0		
		3 4	land information sources patterns of land use and built form	2.55	0.77	0	0	0	0	0		0 0		0	0 0			0	5 33
	Natural and	5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0		0 0		0	0 0		0	0	25
	Cultural Systems	6	social and cultural influences on design	2.19	0.81	0	0	0	0	0		0 0		0	0 0			0	7
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0		0 0		0	0 0			0	5
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0 0	0	0	0 0			0	10
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	10
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	9
	Design and	11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	23
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	19
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0		0 0		0	0 0		0	0	14
KNOWLEDGE		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	1	1	1	0		0 0		0	1 0			0	19
STATEMENTS		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0		0 0	_	0	0 0			0	3
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	0	1		1 1	Ü	0	0 1	U		1	24
	Public Policy and	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0		0 0		0	0 0		0	0	9
	Regulation	18 19	political and regulatory approval processes land and development economics	1.67 1.47	0.92 0.83	0	0	0	0	0		0 0		0	0 0			0	8
	regulation	20	emerging trends and issues	1.65	0.83	0	0	0	0	0		0 0		0	0 0	_	_	0	4
		21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0		0 0		0	0 0	_	_	0	30
		22	visual resource assessment	1.91	0.88	0	0	0	0	0		0 0		0	0 0		0	0	42
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0		0 0		0	0 0	_	0	0	20
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0 0	0	0	0 0	_	0	0	15
	Design, Planning	25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	12
	and	26		2.33	0.8	0	0	0	0	0		0 0		0	0 0			0	15
	Management at	27		1.73	0.76	0	0	0	0	0		0 0	_		0 0	_			4
	Various Scales		ecological planning principles	2.23	0.8	0		0		0		0 0	_	_	0 0	_			10
	and Applications		Water resource management	1.91	0.84	0	0	0	0	0			0		0 0				10
			wetland	1.78	0.83	0	0	0	0	0			0	_	0 0	_	_	0	14
		31	floodplain management land and water reclamation procedures including quarry, mine and landfill reclamation	1.8	0.86	0	0	0	0	0		0 0		0	0 0	_		0	15
		32	treatment of toxic materials	1.43 1.05	0.84 0.86	0	0			0		0 0			0 0			0	8
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	Ongoing GI System	Budgeting for GI System Management	Database Administration	System Management	User Support	organizational Models Organizational Models for Geocoding GI	s and/or Pr S&T Training	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	rederal Agencies & National & International Organizations &	Professional Organizations	The Geospatial Community	Sum Horizontal Results
		34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	4
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	19
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	14
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	1
	Site Design and	39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2
	Engineering:	40	sustainable construction practices	1.82	0.84	0	0	0	0	0		0 0	0	0	0	0	0	0	0	4
	Materials,	41	construction equipment and technologies	1.76	0.87	0	0	0	0	0		0 0	0	0	0	0	0	0	0	1
	Methods,	42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0		0 0		0	0	0	0	0	0	12
	Technologies	43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0		0 0	_	0	0	0	0	0	0	6
	and Applications	44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0		0 0		0	0	0	0	0	0	7
		45	utility systems	1.77	0.77	0	0	0	0	0		0 0		0	0	0	0	0	0	12
		46	Irrigation systems	1.75	0.88	0	0	0	0	0		0 0	_	0	0	0	0	0	0	10
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	10
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	4
		49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	3
KNOWLEDGE STATEMENTS		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	1
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	38
	and Administration	56	basic construction law	1.48	0.84	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2
		58		1.52	0.83	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2
	Communication	61		2.25	0.85	0	0			0		0 0			_	0	0	0	0	26
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	1	0	0		0 0	_	0	0	0	0	0	0	55
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	_			0		0 0		_	0	0	0	0	0	6
		64	public relations, outreach, and image development	1.49	0.97	0	_	0		0			0			0	0	0	0	2
		65	environmental ethics	2.08	0.82	0	0	_		0		0 0		0	0	0	0	0	0	3
	Values and Ethics	66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2
	in Practice	67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0		0 0		0	0	0	0	0	0	1
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	2

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	st st		Database Administration	System Management	User Support Organizational Models	Organizational Models for Geocoding GI	Svstems and/or Program GIS&T Training & Education	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy Federal Agencies &	National & International Organizations &	Professional Organizations	The Geospatial Community	Sum Horizontal Results
		69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	3
	Landscape Architecture	70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	6
	History & Criticism	71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	1
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0 0	0	0	0	1	0	0	0	0	9
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	13
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	10
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	11
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	9
		78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0		0 0	0	0	0	0	0	0	0	0	6
	Public Policy and	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0		0 0		0	0	0	0	0	0	0	6
COMPETENCIES	Regulation	80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines Influence public policies on areas such as growth and land and water management by testifying, lobbying, or	0.77	0.69	0	0	0	0		0 0		0	0	0	0	0	0	0	3
	Danisa Blassia	81	preparing written documents for public distribution	0.73	0.75	0	0	0	0		0 0	0	0	0	0	0	0	0	0	7
	Design, Planning, and Management	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0		0 0		0	0	0	0	0	0	0	2
	at Various Scales	83 84	Analyze relationships among design elements by determining opportunities and constraints  Develop conceptual design, planning, and management solutions	2.33 2.39	0.62 0.61	0	0	0	0		0 0		0	0	0	0	0	0	0	8 4
	and	85		2.45	0.59	0	0	0	0		0 0	0	0	0	0	0	0	0	0	5
	Applications Site Design and	86	Evaluate design alternatives to determine the appropriate solution  Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and	2.13	0.64	0	0	0	0		0 0		0	0	0	0	0	0	0	19
	Engineering: Materials,	87	sedimentation control)  Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0		0 0	0	0	0	0	0	0	0	0	14
	Methods,	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	14
	Technologies and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0		0 0	0	0	0	0	0	0	0	0	3
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	1

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System	Organizational Models for Geocoding GI Systems and/or Program	GIS&T Training & Education	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy Federal Agencies &	National & International Organizations &	Professional Organizations The Geospatial	Community	Horiz	Sum izontal esults
		98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	1	0	0	0	0 (	)		1
	Communication	100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	)	:	20
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	)		1
COMPETENCIES		104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	)		1
	Values and Ethics		Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	)		1
	in Practice	107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	1	0	0	0	0	0 (			1
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	1	0	0	0 (	)		4
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	)		1
					0					4			4		4		4		4			
					Sum	1	2	3	1	1	1	1	1	1	1	3	1	1	1 '	24	4	
					Average	0.01	0.02	2 0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01 0.	JT		

## Appendix H - Phase Two

Knowledge Statement / Competency Division												Λ	alutias	1 1104						
Statement / Competency				Cor	nmand of	ē						An	aiyiica	ai iviet	hods					
Statement / Competency				Knowle	dge at time of	g	ΑN	<i>J</i> 11	AM	2			A	NA3				AM	14	
Statement / Competency					egree	pu Si	, · ·	• • •	7 (14)	_								,		
	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
	_	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	1	0	0	0	0	1	0	1	1	1	1	0	0
(	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66		0	1	0	0	0	1	0	0	0	0	1	1	0	0
		6	social and cultural influences on design	2.19	0.81		0	0	0	0	0	0	0	0	1	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
	<u> </u>	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	<u> </u>	10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
1	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	1	0	0	0	0	0	0	0	1	0	1	0	1	0
اما	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	1	0	0	0	0	1	0	0	1	0	1	0	0	0
1		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
F	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1		21	photogrammetry and remote sensing	1.47	0.84	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0
1		22	visual resource assessment	1.91	0.88	1	0	1	0	0	1	0	1	0	0	0	0	1	0	0
[	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0
1	and	24	urban landscape	2.17	0.71	1	0	0	0	0	1	0	1	0	1	0	1	0	1	1
	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	1	0	0	0	1	1	1	0	0	0
Statements	Various Scales	26	conservation of natural resources	2.33	0.8	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
1		29	Water resource management	1.91	0.84	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
1		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0
1	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	1	1	1	0	1	1	1	0	0	0
1	Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0
1	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1	Technologies	45	utility systems	1.77	0.77	1	0	0	0	1	1	1	0	0	1	0	0	1	0	1
1	and Applications	46	Irrigation systems	1.75	0.88	1	0	0	0	1	1	1	0	0	1	0	0	1	0	0
l L'	and Applications	47	lighting systems	1.7	0.79	1	0	0	0	1	1	1	0	0	1	0	0	1	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1	Communication -	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
V	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra							
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	ර 1	1	1	0	1	0	0	0	0	0	0 Ad	1	0	0	1							
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1							
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1							
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0							
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0							
		82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0							
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1							
	and	84 85	Develop conceptual design, planning, and management solutions	2.39	0.61 0.59	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0							
Competencies _	Site Design and	86	Evaluate design alternatives to determine the appropriate solution  Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.45	0.59	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1							
	Engineering: - Materials, Methods	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	0	0	0	1	1	1	0	1							
	Technologies -	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	1	1	0	0	1	1	0	1	0	1							
_	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0							
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0							
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0							
																		L		<u> </u>							
					Sum		8	8	1			11			17	11	25		3	14							
					Average		0.16	0.16	0.02	0.16	0.27	0.22	0.16	0.04	0.35	0.22	0.51	0.31	0.06	0.2							

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications advanced technol	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	1	1	1	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	1	1	1	0	0	1	1	1	1	0	1
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	0	0	1	1	0	1	1	1	1	1	0	1
		6	social and cultural influences on design	2.19	0.81	1	0	0	1	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	1	0	1	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	1	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	1	1	0	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	1	1	0	0	0	1	1	1	1	0	0
	Planning Theories and Methodologies		relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	1	1	0	0	1	1	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	1	0	0	0	1	1	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	1	0	0	0	1
	Dublic Delieu and	16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0	0	0	0	1
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	1	0	0	0	0	0	0	1	0
	Davis Discriss	22	visual resource assessment	1.91	0.88	1	0	0	0	0	1	0	0	1	1	0	1	1
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	1	1	0	0	1	1	1	1	1	1
	and	24	urban landscape	2.17	0.71	1	1	0	1	0	0	0	1	1	1	0	1	0
Knowledge	Management at Various Scales	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	1	0	0	1	0	1	1	0	0	0
Statements	and Applications	26 28	conservation of natural resources ecological planning principles	2.33	0.8	1	0	0	1	0	1	1	0	1	1	1	0	0
	and Applications	29	Water resource management	1.91	0.84	1	0	0	1	0	0	1	0	1	1	1	0	0
		31	floodplain management	1.8	0.86	1	0	0	1	0	0	1	0	1	1	1	0	0
		36	roadway design principles	2.15	0.83	1	0	0	1	0	0	0	0	1	1	1	0	0
	Site Design and	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.13	0.72	1	0	0	1	0	0	0	0	1	1	0	0	0
	Engineering:	42	grading, drainage and stormwater treatment	2.78	0.72	1	0	0	0	0	0	0	0	1	1	1	1	0
	Materials,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	1	1	1	0	0
	Methods,	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	1	1	0	0	0
	Technologies	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	1	1	0	0	0
	and Applications	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	1	1	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	1	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	0	1
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	0	0	0	0	0	0	0	0	1	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	1	1	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	1	0	0	0	0	1	0	1	1	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	1	0	0	1	0	1	1	1	1	1
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	1	0	0	1	0	1	1	1	1	1
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	1	0	1	1	1
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	1	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	1	0	0	0	0	1	0	0	0	1
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	11	0	0	0	0	0	0	0	1	0	0	0	0
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	1	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	1	0	0	1	0	1	1	1	1	0
	Materials, Methods.	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	1	0	0	0	0	1	0	1	1	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	1	0	0	1	0
<u> </u>	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	1	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	1
					Sum		2	2	21	5	4	10	8	36	22			
					Average		0.04	0.04	0.43	0.10	0.08	0.20	0.16	0.73	0.45	0.39	0.33	0.27

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					dge at time of Degree			AM	8		Al	M10			A۱	<i>I</i> 11			AM12
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Spatial Sampling for Statistical Analysis	Principles of Semi- variogram Construction	Principles of Kriging	Kriging Variants	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	0	1	1	0	1	1	1	0	1	1	1	1
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	1	1	1	1	0	1	1	1	0	0	0	1	0
	2 22 270.010	6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	1	0	1	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	1	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	1	0	0	0	0	0	0	1	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	1	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	1	0	1	1	0	1	1	1	0	0	1	1	0
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	1	1	0	0	0	0	1	1	0	0	1	1	1
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	1	1	0	0	0	0	0	0	0	1	0	1	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	1	0	0	0	1	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	1	1	0	0	0	0	1	0	0	0	1
		22	visual resource assessment	1.91	0.88	1	0	0	1	1	0	0	0	0	1	0	0	0	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	1	0	1	1	0	0	0	0	1	0	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Knowledge	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	1	1	0	0	0	0	0
Statements	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	1	1	0	0	0	0	0	0	0	0	0
Statements	and Applications	28	ecological planning principles	2.23	8.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	[	29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	1	0	1	1	0	1	1	1	0	0	0	0	0
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	1	1	0	1	1	1	0
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	1	1	0	1	1	1	0
	Materials.	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	1	1	0	0	0	0	0
	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	1	1	0	0	0	0	0
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	1	0	0
	and Applications	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	1	0	0
	1,	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	1	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	1	0	0	0	0
	C	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	1	0	0	0	0
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	0	0	0	0	0	0	0	1	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Spatial Sampling for Statistical Analysis	Principles of Semi- variogram Construction	Principles of Kriging	Kriging Variants	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	1	0	0	0	0	1	1	1	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	1	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	1	0	0	0	0	1	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	1	0	0	0	0	1	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	1	1	0
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	1	0	0	0	0	0	1	1	0	0	0	1	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	1	0	0	0	0	0	1	1	0	0	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	1	1	0	1	0	1	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	1	0	0	0	0
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					Sum		14	3	8	8	3	9	14	14	8	7	9	13	4
					Average		0.29	0.06	0.16	0.16	0.06	0.18	0.29	0.29	0.16	0.14	0.18	0.27	0.08

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Metaphysics & Ontology	Epistemology	From Concepts to Data	Place & Landscape	Common-sense Geographies	٥	Political Influences	Properties	Fields in Space & Time	Integrated Models	Spatial Distribution	Region
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	1	0	1
	Natural and	4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	1	0	1
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	1	1	1	1
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	1	0	0	0	0	0	0	0	1
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	1	0	0	0	0	0	0	0	0	0	0	1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	1	0	1	0	0	0	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	1	1	0	0
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	1	0	0	0	0	1	1	0	0
	and wethodologics	13	influence of context on design, planning, and management decisions	2.45	0.76	11	0	0	0	0	0	0	0	0	0	1	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	1	1	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	1	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	1	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	1	0	0	0	0	0	0	0	1	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	1	0
Knowledge	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0
Knowledge	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	1	0	0	1	0	0
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	1	0	0	1	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	1	0	0	1	0	1
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	1	0	0	1	0	0
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	1	0	0	0	0	0	0	0	0	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	1	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	1	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Metaphysics & Ontology	Epistemology	From Concepts to Data	∞ŏ	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Space &	Integrated Models	Spatial Distribution	Region
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	1	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	1	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	1	1	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales		Develop conceptual design, planning, and management solutions	2.39	0.61	1	0		-								-	-
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0
·	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	1	0	0	1	1	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	1	0	0	1	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0
	Communication		Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0
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					Average		0.06	0.02	0.08	0.06	0.04	0.04	0.16	0.04	0.06	0.24	0.10	0.14

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications advanced techno	History of Cartography	Technological Transformations	Source Materials for Mapping	Projec		Basic Concepts of Symbolization	ŭ	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays
	-	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0
	-	6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0		0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0
	-	10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	1	0	1	0	0	0	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0
	Planning Theories	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0
	-	14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	1	0	0	0	0	0	0	0	0
	-	16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	1	0	0	0	0	0	0	0	0
	Public Policy and		bottimumbation and baddation motificate, including sharing knowledge and bydidating battorness					-								
	Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0
	-	21	photogrammetry and remote sensing	1.47	0.84	1	0	1	1	0	0	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	1	0	0	0	1	1	1	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	1	0	0	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	1	0	0	0	0	0
Knowledge	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	1	0	0	0	0	0
Statements	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0
	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0
	_	29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	1	0	0	0	0	0
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0
	Materials,	42	grading, drainage and stormwater treatment	2.78 2.28	0.57 0.82	1	0	0	0	0		0	0	0	0	0
	Methods,	44	erosion and sedimentation control			1	0	0			1					
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	1	0	0	0	0	0
	and Applications	46	Irrigation systems	1.75 1.7	0.88 0.79	1	0	0	0	0	1	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	U	U	U	U	1	U	U	U	U	U
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	1	1	0	1	1	1	1	1
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	1	1	1	0	1	1	1	0
	Communication -	62		2.71	0.73	1	1	1	1	1	0	1	1	1	1	1
	Values and Ethics in Practice		environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0
	Design, Planning,		Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	11	0	0	0	0	0	0	0	0	0	0
	and Management		Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	11	0	0	0	0	0	0	0	0	0	0
	at Various Scales		Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	1	0	0	0	0	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	1	0	0	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	11	0	0	0	0	1	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	1	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	1	1	1	0	0	0	0	0
															<u> </u>	1
					Sum		4	7	6	5	15	2	5	4	4	2
					Average		0.08	0.14	0.12	0.10	0.31	0.04	0.10	0.08	0.08	0.04

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic Data	Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0
	Sandrai Systomis	6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0	0
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0
	and iviethodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	1	0	0	0	0	0	0	0	1
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	0	1	0	0	1	1	0
		22	visual resource assessment	1.91	0.88	1	1	1	1	1	0	1	1	1	1	1	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	1	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0
Knowlodgo	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0
Knowledge Statements	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0
	Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	1	0	0	0	0	0	0	0	0	0
	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0
	and Applications	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0
	ана присаноно	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	0	0	0	0	0	0	0	0	1	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	0	1	0	0	0	1	1	0	1
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	1	1	1	0	1	0	0	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0

Natural & Cumulation   Public Policy Polic				LABOK			LAAB					GIS&						
Note   Public Policy and Respiration and Management   Public Policy and Management   Public					Cor	mmand of	Jer				Cartog	raphy 8	Visu	alizatio	on			
Richarder   Competency Division   Domains   Richarder   Richarde						0			CV4	ļ.			C,	<b>/</b> 5		C/	/6	
Astural & Cultural   Systems   75   Forder quantitative analyses to evaluate the interactions of natural and cultural features.   1.64   0.78   1   0   0   0   0   0   0   0   0   0	Statement / Competency	Domains		Knowledge Statements / Competencies	Mean		applications nced technol	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic Data	Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
Natural & Cultural   Systems   76   Characteristics, and systems   76   Public Policy and Regulation   79   Public Policy and Regulation   79   Confirm code compliance (e.g. zoning, environment, and accessibility)   1.37   0.81   1   0   0   0   0   0   0   0   0			74	and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0
Public Policy and Regulation   79   Confirm code compliance (e.g. zoning, environment, and accessibility)   1.37   0.81   1   0   0   0   0   0   0   0   0		Natural & Cultural	75		1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0
Public Policy and Regulation   To   Design, Planning, and Management at Various Scales   Analyze relationships among design elements for construction and Applications   Analyze relation   To   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water, water supply, ground water)   Design of protection and management of water resources (e.g. start water)   Design		Systems	76		1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0
Regulation   Persign   P			77		1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0
Sample   S		Regulation			1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0
A Various Scales and							1											
Size Design and Engineering: Materials, Methods, Technologies and Applications and Administration and Admi																		
Site Design and Engineering: Materials, Methods, Technologies and Applications   200   2		l .																_
Engineering: Materials, Materials, Methods, Technologies and Applications  Construction Documentation and Administration  Communication  Basedine relation Control (a.g. storm water resources (e.g. storm water, water supply, ground water)  Construction Documentation and Administration  Communication  Basedine relation Control (a.g. storm water resources (e.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water)  Basedine relation Control (a.g. storm water, water supply, ground water)  Basedine relation Control (a.g. storm water)  Basedine relation C	Competencies			Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and			<u> </u>											
Rechnologies and Applications   Rechnologies and Applications   Rechnologies					2.05	0.66	1	0		0	0	0		0		0	0	0
Technologies and Applications   89   Design elements for construction considering materials, structural issues, and construction technologies   1.94   0.69   1   0   0   0   0   0   0   0   0   0		,	88		2 28	0.62	1	0	0	0	0	0	0	0	0	0	0	0
Documentation and Administration   90   Prepare construction documents including plans, working drawings, and technical specifications   1.87   0.77   1   0   0   0   0   0   0   0   0   0		O O	90				1											
Communication   Maintain clear communication among collaborators through correspondence and project coordination   2.19   0.76   1   0   1   0   0   0   0   0   0   0		Documentation	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0
Sum 4 6 2 3 1 3 2 3 4 3 3		Communication	98				1				-	-	_			_		
			100	Create graphic materials in a variety of media	2.19	0.76	1	0	1	0	0	0	0	1	0	0	0	0
						Cum		4	6	2	2	1	2	2	2	4	2	2
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications advanced technol	Planning for Design	Application/ User Assessment		Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	ч	User Interfaces	Implementation Planning
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5 6	natural site conditions and ecosystems social and cultural influences on design	2.76 2.19	0.66 0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.19	0.81	<u>1</u> 1	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	1	1	1	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and		relationship between human and natural systems such as resource conservation, habitat restoration and																
	Planning Theories	12	creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	1	0	0	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	1	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	1	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	1	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Knowledge	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	11	0	0	0	0	0	0	0	0	0	0	0	0	0
Statements	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	11	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	36 37	roadway design principles elements of vehicular and pedestrian circulation systems and their design requirements	2.15	0.83 0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	42	grading, drainage and stormwater treatment	2.57	0.72	<u>1</u> 1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	44	erosion and sedimentation control	2.78	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	45	utility systems	1.77	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	0	0	0	1	1	1	1	0	0	0	0
	Values and Ethics in Practice		environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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					dge at time of Degree			DA2		D,	A3		DA4			DA5		DA6	DA7	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Planning for Design	Application/ User Assessment	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning	
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0						0			0		0	0	
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0			0		0	0	0	0	0	0	0	0	
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0												0	
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
·	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0									Ů		- 1	0	
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	1	1	1	0	0	0	1	0	
					Sum		1	1	2	1	1	3	3	3	1	1	1	1	1	
					Average		0.02	0.02	0.04	0.02	0.02	0.06	0.06	0.06	0.02	0.02	0.02	0.02	0.02	

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	Geometric Primitives	The Topological Model	The Network Model	Linear Referencing	Modeling Three- dimensional Entities
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0
	Cultural Systems	5		2.76	0.66	1	0	0	0	0		0	0	0	0
	2 2.1.4.4. 0 , 0.01110	6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0
		7	g	2.1	0.87	1	0	0	0	0		0	0	0	0
		8	creativity and process including design theory and problem -solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0
		10		2.33	0.76	1	0	0	0	0	0	0	0	0	0
	Design and	11	ů i	2.53	0.75	1	0	0	0	0	0	0	0	0	0
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	0	0	0	0	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0
	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0
nowledge	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0
	''	29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0
	Cita Dagign card	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	1	0	0
	Site Design and	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0
	Engineering: Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0
	Methods.	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0
	and Applications	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0
	and Applications	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	0	0	0	0	0	0	1	0
	0	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	0	0	1	1	0	0	0	1
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	1	0		1	0	0	1
	Values and Ethics in Practice	65		2.08	0.82	1	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	Geometric Primitives	The Topological Model	The Network Model	Linear Referencing	Modeling Three- dimensional Entities
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0		0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	1	1	0	0	0	1	0	0	1
					0										
					Sum		3	1	1	1	2	2	2	1	3
					Average		0.06	0.02	0.02	0.02	0.04	0.04	0.04	0.02	0.06

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Knowledge Statement / Competency Division	Domains				Deviation	applications nced technol		Data		Vector-to-Raster & to-Vector Conver			Scale &	Aggregation of Entities				Conceptual Model of Uncertainty	Error Problems of Currency,
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	and weinodologies					1												0	0 0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	1	0	0	0	0	0	0	1	0	0	0	0 0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	1	0	0	0	0	0	0	0	0	0	0	0 0
		17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	1	0	0	0	0	0 0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	1	1	0	1	0	0	0	0	0	0 0
		22	visual resource assessment	1.91	0.88	1	1	0	0	1	1	0	1	0	0	0	1	1	0 0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	1	0	0	0 0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0 0
Knowlodgo			planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0		0	0	0	0	0	0 0
	Various Scales		conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0 0
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0		0	0	0	0	0	0 0
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	1 1 1	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	1	0	0	0 0
	Documentation	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	1	0	0	1	0	0	0	0	0	0	1 1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0 0
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	1	0	0	0	0	0	0	0	0	1	1 1
		65	environmental ethics	2.08	0.82	1	0		0	0	0	0	0		0		0	0	0 0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster- to-Vector Conversions	Raster Resembling	Coordinate Transformations	Scale & Generalization	Aggregation of Spatial Entities	Database Change	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods,	87 88	Design for protection and management of water resources (e.g. storm water, water supply, ground water)  Design pedestrian, vehicular, and non-motorized circulation systems	2.05	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies		Design pedestrian, verilloular, and non-inotonized diffulation systems			1														
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0
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					Sum		0.08	0.06	3	0.06	2	1	3	5 0.10	1	5	5	4	2	0.04
<u> </u>				1	Average		0.08	0.00	0.00	0.00	0.04	0.02	0.06	0.10	0.02	0.10	0.10	0.08	0.04	0.04

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation		History of Understanding Earth's Shape		Unsystematic Methods		Ŏ	Plane Coordinate Systems		Horizontal Datum's	Vertical Datum's	Map Projection Properties	Map Projection Classes	Map Projection Parameters	
		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76	1	1	0	1	1	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and	11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Methodologies	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	1	1	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	0	0	0	0	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	0	0	0	0	0	1	0	0	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Knowlodgo	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Knowledge	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	0	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	0	1	1	1	1	1	1	1	1	1
	Values and Ethics in Practice		environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	History of Understanding Earth's Shape	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Systems	76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning,	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Management	83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	at Various Scales	84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials, Methods.	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum		3	2	3	3	2	2	2	2	2	4	2	2	2
					Average		0.06	0.04	0.06	0.06	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications advanced technol	Thematic Accuracy		Primary & Secondary Sources	Survey Theory & Electro- optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation		Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors		Spatial Data Infrastructures
	-	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and	4	patterns of land use and built form	2.43	0.76 0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Systems	5	natural site conditions and ecosystems	2.76		1	0	0	0		0	0	0	0	0	0	0	0	0	0	0
1	-	6 7	social and cultural influences on design regional hazard design considerations	2.19	0.81 0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	regional nazard design considerations creativity and process including design theory and problem –solving strategies	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	10	human factors such as behavior, perception, psychological and sensory response	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	11	natural factors such as ecological relationships	2.53	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and		relationship between human and natural systems such as resource conservation, habitat restoration and																		
	Planning Theories and Methodologies	12	creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Mothodologico	13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	photogrammetry and remote sensing	1.47	0.84	1	0	1	1	0	0	0	0	1	1	1	1	1	1	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	1	0	1	1	0	1	1	0	0	1	0	0	0
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Knowledge	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statements	Various Scales	26	conservation of natural resources	2.33	8.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Otatements	and Applications	28	ecological planning principles	2.23	8.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Technologies	45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	and Applications	46 47	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	-		0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Communication	62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Reference   Part   Pa				LABOK			LAAB								IS&T E	-						
Complementary   Complementar					Knowle	dge at time of	nd other Jy		GD6	6	GD7	G	D8				10		GD	11	GI	)12
Natural & Cultural Systems  75  Public Policy and Regulation  Design, Planning, and an analyses to evaluate the relationship between the natural and cultural evaluated systems  Regulation  Design, Planning, and Management and Management proposals on natural cultural systems  Avairus & Competencies  Av	Statement / Competency	Domains		Knowledge Statements / Competencies	Mean		Computing applications are advanced technolog	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro- optical Methods	Tablet Digitizing	Scanning & Automated Vectorization		Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	ంగ	Metadata	Spatial Data Infrastructures
Natural & Cultural Systems   Systems   Systems   Systems   Systems   Systems   Systems   To   To   To   To   To   To   To   T			74	and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Policy and Regulation			75	characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Policy and Regulation   79   Confirm code compliance (e.g. zoning, environment, and accessibility)   1.37   0.81   1   0   0   0   0   0   0   0   0		Systems	76	features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regulation   Perpare   P			77		1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
And Management at Various Scales and Management of Material Register and Management Register and Manag		Regulation		Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A				1 010			1							_								
Competencies   And   Sic   Design and Engineering: Materials, Methods, Technologies and Applications   Applications and Applications   Applications and Administration   Prepare construction documents including plans, working drawings, and technical specifications   Applications   Applicat							1															
Site Design and Engineering: Materials, Methods, Technologies and Applications  Construction Documentation and Administration and Administration  Communication  Prepare construction documents including plans, working drawings, and technical specifications and Administration  Communication  Communication  Prepare construction among collaborators through correspondence and project coordination and Administration  Communication  Prepare construction among collaborators through correspondence and project coordination and Administration and Adm							1		_					_								
Materials, Methods, Technologies and Applications    Construction Documentation and Administration    Materials, Methods, Technologies and Applications    Construction Documentation and Administration    Materials, Methods, Technologies    Methods	Competencies	Site Design and		Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and																		
Technologies and Applications  89  Design elements for construction considering materials, structural issues, and construction technologies  1.94  0.69  1.00  0.0		Materials,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
And Applications   89   Design elements for construction considering materials, structural issues, and construction technologies   1.94   0.69   1   0   0   0   0   0   0   0   0   0			88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Documentation and Administration   90   Prepare construction documents including plans, working drawings, and technical specifications   1.87   0.77   1   0   0   0   0   0   0   0   0   0			89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communication   Walking the Communication and project continuous models and project continuous		Documentation	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum 2 4 2 1 2 2 1 1 2 2 1 1 2 1 3 1		Communication					1		0								_				0	
			100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
						Cum		2	4	2	1	2	2	1	2	2	4	4	2	4		
						Average								U U3								T 0.02

			LABOK			LAAB									GIS	&T BOK								
				Cor	mmand of	er			GIS&	T and So	ciety					Or	ganizati	onal & Ins	stitutional Aspect	S				
					dge at time of Degree	od oth	G	S1	GS2	GS	3	GS5	OI1		C	DI2			OI3		OI5		Ol6	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and advanced technology	Liability	Privacy	Models of Benefits	Uses of Geospatial Information in Government	Ъ	Data Sharing Among Organizations & Individuals	Learning from Experience	Ongoing GI Revisi	Budgeting for GI System Management	Database Administration System Management		Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders		Spatial Data Sharing Among Organizations		The Geospatial Community	Sum Horizontal LABOK Results
		3		2.55	0.77	1	0	0	0	0	0	0	0	0	0	0 0		0	0	0	0	0	0	5
	Natural and	4		2.43	0.76	1	0	0	0	0	0	0	0	0	0	0 0		0	0	0	0	0	0	33
	Cultural Systems	5		2.76	0.66	1	0	0	0	0	0	0	0	0	0	0 0	_	0	0	0	0	0	0	25
	1	6		2.19	0.81	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	7
		7	<u> </u>	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0 0	_	0	0	0	0	0	0	5
		8	, , , , , , , , , , , , , , , , , , , ,	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0 0		0	0	0	0	0	0	10
	1	10		2.33	0.76	1	0	0	0	0	0	0	0	0	0	0 0		0	0	0	0	0	0	9
	Design and	11		2.53	0.75	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	23
	Planning Theories and Methodologies	12	creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	19
	and Methodologies	13		2.45	0.76	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	14
		14		2.37	0.93	1	0	0	0	0	0	0	0	1	1	1 0	0	0	0	0	1	0	0	19
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	1	1	0	1	0 1	1	1	1	0	0	1	1	24
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	1	1	0	1	0	0	0	0	0	0 0	0	0	0	0	0	0	0	9
		21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	30
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	42
	Design, Planning	23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	20
	and	24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	15
I/o accida da a	Management at	25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	12
Knowledge	Various Scales	26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	15
Statements	and Applications	28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	10
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	10
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	15
	Site Design and	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	19
	Engineering:	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	14
	Materials,	42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	12
	Methods,	44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	7
	Technologies	45		1.77	0.77	1	0	0	0	1	0	0	0	0	0	0 0	0	0	0	0	0	0	0	12
	and Applications	46		1.75	0.88	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	10
	and Applications	47		1.7	0.79	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	10
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	0	0	38
	0	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	1	0	1	0	0	0	0	0 0	0	0	0	0	0	0	0	26
	Communication	62		2.71	0.73	1	0	0	_	0	0	0	0	1	1	0 0	_	0	0	0	0	0	0	55
	Values and Ethics in Practice		environmental ethics	2.08	0.82	1	0	0		0	0	0	0	0	0	0 0		0	0	0	0	0	0	3

		LAAB GIS&T BOK																						
		LABOK						GIS&T and Society Organizational & Institutional Aspects																
			Knov	Knowledge at Degree		and oth logy	GS	S1	GS2	GS	3	GS5	OI1		Ol2	2			OI3		OI5		Ol6	
Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies	Меа	an I	itandard eviation	Computing applications a advanced technolog	Liability	Privacy	10	Uses of Geospatial Information in Government	Public Participation GIS	Data Sharing Among Organizations & Individuals	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Adminis	User Support	Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	The Geospatial Community	Sum Horizontal LABOK Results
		74 Conduct field investigations to identify significant natural and cultural features, characteristicand systems	2.00	6	0.74	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	13
	Natural & Cultural	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.6	4	0.78	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	10
	Systems	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	9	0.78	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	11
		Predict implications of design, planning, and management proposals on natural cultural sys both within the site and in the larger context	tems 1.8	8	0.76	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9	
	Public Policy and Regulation	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.3	7	0.81	1	0	0	0	1	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	6
	Design, Planning, and Management		2.13		0.75	1	0	0		0	0	0	0	0	0 (	_	0	0	0	0		_		2
		83 Analyze relationships among design elements by determining opportunities and constraints	2.33		0.62	11	0	0	0	0	0	0	0	0			0	0	0	0	_	_	_	8
	at Various Scales	84 Develop conceptual design, planning, and management solutions	2.39		0.61	1	0	0	0	0	0	0	0	0	0 (	_		0	0	0	0	0	0	4
Competencies	and	85 Evaluate design alternatives to determine the appropriate solution	2.4	5	0.59	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	5
	Site Design and Engineering:	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion sedimentation control)	2.13	3	0.64	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	19
	Materials, Methods,	Design for protection and management of water resources (e.g. storm water, water supply, ground water)			0.66	1	0	0	0	0	0	0	0	0	0 (	) (	, ,	0	0	0	0	0	0	14
	Technologies	Design pedestrian, vehicular, and non-motorized circulation systems	2.2	8	0.62	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	14
	and Applications	Begin elements for construction considering materials, structural issues, and construction technological design elements for construction considering materials, structural issues, and construction technological design elements for construction considering materials, structural issues, and construction technological design elements for construction considering materials, structural issues, and construction technological design elements for construction considering materials, structural issues, and construction technological design elements for construction considering materials, structural issues, and construction technological design elements for construction considering materials.	1.9 <sup>4</sup>	4	0.69	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	3
Construction Documentation and Administration	90 Prepare construction documents including plans, working drawings, and technical specifications	1.87	7	0.77	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	1	
	Communication	Maintain clear communication among collaborators through correspondence and project coordination	1.5		0.9	1	0	0	0	0	0	0	0	0	0 (			0	0	1	0	0	0	1
		100 Create graphic materials in a variety of media	2.19	9	0.76	1	0	0	0	0	0	0	0	0	0 (	) (	0	0	0	0	0	0	0	20
																								<del>                                     </del>
				Sur			1	1	2	3	1	1	1	2	3 '	•	1 1	1	1	1	1	1	1	1
				Ave	erage		0.02	0.02	0.04	0.06	0.02	0.02	0.02	0.04	0.06 0.	U2   U.	J2   0.02	0.02	0.02	0.02	0.02	0.02	0.02	1

## **Appendix I - Phase Three**

			LABOK			LAAB							# Tech Module
Knowledge Statement /				Knowle	mmand of dge at time o Degree	outer ons and vanced			Courses with Objectives Incorporating LABOK				
Competency Division	Domains	Domains Knowledge Statements / Competencies		Mean	Standard Deviation		ı	II	Ш	IV	v	VI	Accreditation Knowledge Statements or Competencies
1		3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0
'	Not well and	4	patterns of land use and built form	2.43	0.76	1	2,3,4,6	2,3,4,6	2	2,3,4	2	4	6
	Natural and	5	natural site conditions and ecosystems	2.76	0.66	1	2,4	2,4,5	2	2,4,5	2	1	6
'	Cultural Systems		social and cultural influences on design	2.19	0.81	1	3	0	0	0	2	0	2
'		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0
'		8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	1,5	1,5	2	1,5	2	0	5
'		10		2.33	0.76	1	2,3,4	2,3,4	0	2,3,4	2	4	5
'	5	11		2.53	0.75	1	5	5	2	5	2	0	5
	Design and Planning Theories and Methodologies	12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	2,4,5	2,4,5	0	2,4,5	2	1	5
'		13	influence of context on design, planning, and management decisions	2.45	0.76	1	4,5	4,5	2	4,5	2	0	5
'		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	5	5	0	5	0	1	4
'		16		2.15	0.99	1	1,2,3	1,2,3,4	1	1,2,3,4	1	4	6
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	4	4	0	4	2	0	4
		21	photogrammetry and remote sensing	1.47	0.84	1	3,5	3,4,6,8	1	3,4,7	1	1	6
		22	visual resource assessment	1.91	0.88	1	1,4,5	1,3,5,8	1,3	1,3,5,7	1	1,4	6
'	Design, Planning		agricultural and rural landscape analysis	1.68	0.85	1	5	5	0	5	1	0	4
'	and		urban landscape	2.17	0.71	1	0	4	2	4	2	0	4
Knowledge	Management at	25		2.12	0.76	1	0	4	0	4	2	0	3
Statements	Various Scales	26		2.33	0.8	1	0	6	0	0	0	0	1
Otatements	and Applications	28		2.23	0.8	1	0	6	2	0	0	0	2
	4,	29		1.91	0.84	1	0	6	2	0	0	0	2
		31	floodplain management	1.8	0.86	1	0	6	0	0	0	0	1
		36		2.15	0.83	1	0	0	0	0	0	0	0
	Site Design and	37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	2	0	1
'	Engineering:	42	grading, drainage and stormwater treatment	2.78	0.72	1	0	0	2	0	2	0	2
'	Materials,	44				1	0	0	2	0	2	_	_
'	Methods,		utility systems	2.28 1.77	0.82	1	0	0	0	0	2	0	2
	Technologies		Irrigation systems	1.75		1	0	0	0	0	2	0	1
'	and Applications		lighting systems	1.73	0.79	1	0	0	0	0	2	0	1
'		47	ilgriting systems	1.7	0.79		U	U	U	U		U	ļ ļ
	Construction Documentation	52		1.9	0.9	1	2,4,5,6	3,4,5,8	3	3,4,5,9	1	1	6
	and Administration		geographic coordinate systems and layout techniques and conventions										
	_	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1.2.3.4	1.2.3.4.5.7.8	1.2.3	1,3,4,5,6,7	1	1,4	6
1	Communication	62		2.71	0.73	1		1,2,3,4,7,8			1	1,4	6
	Values and Ethics in Practice		environmental ethics	2.08	0.82	1	4	4	0	4	0	0	3

Knowledge		LABOK		Command of Knowledge at time of Degree		ns and PT anced W			# Tech Module Courses with Objectives Incorporating LABOK				
Statement / Competency Division	Domains	Knowledge Statements / Competencies				Computer applications and other advanced technology	ı	II	III	IV	v	VI	Accreditation Knowledge Statements or Competencies
		74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	5	5,8	0	5,7	0	0	3
	Natural & Cultural Systems	75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	4	0	4	0	0	3
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	4	0	4	0	0	3
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	5	5	0	5	0	0	3
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	8	0	7	2	0	3
	Design, Planning,			2.13	0.75	1	0	4	0	4	2	0	3
	and Management		Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	5	5	0	5	2	0	4
	at Various Scales		Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	4	0	4	2	0	3
Competencies	and	85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	4	0	4	2	0	3
'	Site Design and Engineering:	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	5	4,5	0	4,5	0	0	3
	Materials, Methods,	87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	4	0	4	0	0	2
	Technologies	88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	4	4	0	4	2	0	4
	and Applications	89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	2	0	1
	Construction Documentation and Administratior	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	2	0	2	0	2
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	х	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	1,3,4	1,3,6	1,2,3	1,3	1	1,4	6