

## Central Lancashire Online Knowledge (CLoK)

Title	Rebuilding after Displacement: A Skills Competency Audit of Built Environment Professional Documentation
Type	Article
URL	<a href="https://clock.uclan.ac.uk/44792/">https://clock.uclan.ac.uk/44792/</a>
DOI	<a href="https://doi.org/10.3390/su142315930">https://doi.org/10.3390/su142315930</a>
Date	2022
Citation	Carmichael, Andrew, Villalba-Romero, Felix and Liyanage, Champika Lasanthi (2022) Rebuilding after Displacement: A Skills Competency Audit of Built Environment Professional Documentation. <i>Sustainability</i> , 14 (23).
Creators	Carmichael, Andrew, Villalba-Romero, Felix and Liyanage, Champika Lasanthi

It is advisable to refer to the publisher's version if you intend to cite from the work.  
<https://doi.org/10.3390/su142315930>

For information about Research at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

Article

# Rebuilding after Displacement: A Skills Competency Audit of Built Environment Professional Documentation

Andrew Carmichael <sup>1,\*</sup>, Felix Villalba-Romero <sup>2</sup> and Champika Liyanage <sup>1</sup><sup>1</sup> School of Engineering, University of Central Lancashire, Preston PR1 2HE, UK<sup>2</sup> Faculty of Economic and Business Sciences, Universidad de Malaga, 29016 Malaga, Spain

\* Correspondence: acarmichael2@uclan.ac.uk

**Abstract:** The displacement of people, caused by disasters, conflicts, and oppression, is a growing global problem, placing significant burdens on both the displaced and their hosts. The built environment is key to providing essential support and a sustainable future for these communities. This paper describes an audit of the competencies identified in built environment professional documentation and its mapping against the competencies determined as being relevant to rebuilding after displacement. Following a step-by-step methodology, an analysis of the built environment sector of four nations enables the identification of the current state of professional competencies through an in-depth review of their published standards. These results are compared with a framework of standards that would maximise the potential of the sector in offering support. It is also identified where there is alignment between existing and ideal competencies, and where there are gaps in provision. Finally, a criticality analysis offers both sector-wide and professional role review. This could help direct the efforts of policy makers, education providers, and the sector itself towards the most effective responses to displacement challenges.

**Citation:** Carmichael, A.; Villalba-Romero, F.; Liyanage, C. Rebuilding After Displacement: A Skills Competency Audit of Built Environment Professional Documentation. *Sustainability* **2022**, *14*, 15930. <https://doi.org/10.3390/su142315930>

Academic Editors: Marc A. Rosen and Syed Minhaj Saleem Kazmi

Received: 22 July 2022

Accepted: 17 November 2022

Published: 29 November 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

**Keywords:** displacement; rebuilding; built; environment; competencies; skills; professional; capacities; documentation

## 1. Introduction

By the end of 2020, there were 82.4 million forcibly displaced people worldwide [1]. These were people fleeing from a range of threats: natural hazards, war, persecution, social unrest, and the recent worldwide COVID-19 pandemic. The rise in the frequency and severity of disasters [2,3] is simultaneous with an increase in hostilities; 2020 witnessed the highest number of conflicts than at any other time since the end of the Second World War. This has led to the number of displaced persons growing over the last decade, with worrying predictions that it will increase further [1]. Millions of these may be internally displaced people, remaining in their own country yet unable to stay in their homes and access their needs, but many more seek refuge in a neighbouring country. Though developed nations are not immune to displacement events of their own (for example, Hurricane Katrina or the current war in Ukraine), many of these incidents occur in the Global South, which means that large numbers of people are relocating to developing countries [4]. Such countries may already be trying to cope with their own problems, and the additional population may add to the pressures on their host's resources, communities, and ability to develop sustainably, with impacts far beyond their borders.

Most displaced persons resettle in urban settings [5]. More than three quarters (76%) of them remain displaced in excess of five years [6]. There are "massive economic and social costs" [7] (p181) associated with this displacement, and the built environment, by which we mean our human-constructed surroundings, and its management, is at the heart of the response to these. The built environment, the way communities are designed and

constructed, directly impacts physical and mental health [8]. Not only will hosted communities require food, water, heating, housing, and healthcare, but there is a need to provide such necessities while maintaining a cohesive society [9]. This provision is inextricably linked to the presence of a professional built environment sector and the need for well-trained personnel who understand displacement challenges. Previous work has identified the built environment roles that can contribute to disaster risk resilience [10], but there remains the question of what is required from the sector, or effectively how they can meet changing needs, should that resilience be tested and lead to displacement episodes. Other research has identified a requirement to “develop the capacity of those responsible for the built environment” [11] (p11). These dual research requirements are met by initially establishing the existing capacity of the professionals in the sector. This was the authors’ task under the REGARD (REbuildinG AfteR Displacement) project and is the focus and important contribution of this paper.

REGARD was a project developed to answer questions relating to displacement. Co-funded by a European Commission Erasmus+ programme grant, REGARD involved a consortium of five higher education institutions from four countries in Europe and Asia. The project aimed to develop competencies in rebuilding communities following disaster- and conflict-induced mass displacements from the perspective of the built environment. In achieving this aim, the project met various objectives: to identify the needs of communities following disaster- and conflict-induced mass displacements from the perspective of the built environment, to investigate the role of the built environment in enhancing social cohesion between host and displaced communities, and to explore the knowledge, skills, and competencies required by built environment professionals to address the needs of the host and displaced communities.

This paper addresses the latter objective by detailing the process of identifying, analysing, and evaluating existing skill competencies of built environment professional bodies, in relation to the needs of the host and displaced communities. It explains how a previously developed framework of competencies, beneficial to the work of rebuilding after displacement, was mapped against an audit of built environment professional documentation to discover the current state of competencies in the built environment sector. The results of the work highlight where there is alignment, the extent of synergy between the two sets of competencies, and where there are gaps in provision. This provided the REGARD project with a platform to develop, test, and implement an innovative series of training courses in catering to the needs of the host and displaced communities; create associated curricula and resources for teachers and learners; and propose policy recommendations to built environment professional bodies in upgrading the professional competencies to address the needs of the host and displaced communities. By applying these methods, the sector can become more resilient and responsive when faced with large-scale displacement of persons, providing the most sustainable solutions to the associated challenges of an increasing trend.

## 2. Materials and Methods

This research began by adopting a previous output of the REGARD project in which partners developed a competency framework for built environment professionals to address the needs of the host and displaced communities. This framework was based on identifying and categorising relevant professionals, deriving an initial competency framework through literature reviews and interview surveys to identify competencies relevant to those professionals, and refining and validating the competency framework using a Delphi technique with an international panel of 19 experts and three rounds of questioning. This research took a considerable amount of time and reported very high response rates that provided rich data. There are many definitions of what constitutes competence and displaying competency in an activity; this research uses as its reference point a concept of “connected pieces of knowledge, skills and attitudes that can be used to adequately solve a problem” [12] (p115).

The REGARD competency framework, developed based on the aforementioned methods, comprises three tiers (Figure 1 is adapted from the REGARD framework to show the competencies in greater detail). Tier 1 identifies what are defined as ‘Foundational Competencies’, of relevance to all professionals (not just those in the built environment sector) with an interest in mass displacement. In total, it includes 13 competencies, such as ‘Causes, contexts, and dynamics of mass displacement’ and ‘specific challenges of mass displacement’. Tier 2 identifies ‘Built Environment Competencies’, which are applicable to all built environment (only) professionals. This includes 16 competencies, such as ‘Policy, legal and regulatory frameworks relevant to the built environment’ and ‘Infrastructure and associated services’. Tier 3 recognises ‘Occupational Competencies’ and is of relevance to a subset of built environment professionals in specific roles. The tier is divided into two components; the first of these (3a) is ‘Planning and Design’, with a total of 26 competencies, for example, ‘Planning and design considerations for infrastructure and service needs’ and ‘Planning and design of public buildings and spaces (including for inclusivity and flexibility)’; the second is (3b) ‘Construction and Facilities Management’, with a total of 17 competencies, for example, ‘The organisation and management of construction and maintenance in mass displacement contexts’ and ‘Construction and maintenance of public buildings and spaces in mass displacement contexts (including for inclusivity and flexibility)’. It is, therefore, clear that every professional role in the built environment sector, and the work they perform, will potentially match with only some, not all, of the REGARD competencies as the framework is deliberately delineated into vocational and personal interests.



Figure 1. REGARD Competency Framework (adapted [13]).

This framework, as part of the REGARD work, provided a platform to conduct an audit of existing competencies of built environment professionals. To perform this audit and identify and analyse the competencies, four stages of work were adopted (Figure 2). The following sub-sections detail these four stages in depth.



**Figure 2.** Stages of Work to Identify and Analyse Built Environment Professional Competencies.

### 2.1. Stage 1—Built Environment Professional Accreditation Body Document List

Given the importance of their work and desire for high standards in the sector, accreditation is of importance for built environment professionals by relevant built environment bodies. The competencies expected to be demonstrated to achieve accreditation are specified in the professional body documentation. These competencies have regularly been used by education providers to develop learning programmes [14], assess existing training in disaster risk reduction for the built environment sector [15], and discuss educational frameworks that support competence development in built environment conservation [16]. Rather than conducting a questionnaire survey or interviews, which has proved challenging for some authors due to low response rates and difficulties in ensuring representative populations [17], reviewing documentation for each role provided by the relevant professional body was adopted. This would deliver an established, formalised sector response to our inquiry rather than potentially subjective replies from individuals, and it is a method that has been employed by similar studies seeking to map built environment professional competencies [18,19].

A template for extracting data from professional competency documents was created using Microsoft Excel to ensure the consistency of approaches and distributed to REGARD project partners for inputs relating to their countries. The partners were required to list accrediting bodies (in their respective countries) of the built environment professional roles identified earlier in the REGARD competency framework (Construction and Facilities Management, Planners, Chartered Engineers, Architects, and Surveyors). Partners were also asked to check and mention if these bodies have either a European and/or international presence.

The first challenge encountered, herein, was that some countries have more accrediting bodies than others. For example, in the UK alone there are 20 out of the 34 bodies identified globally (Appendix A). This consequently impacts the results in favour of UK-derived competencies. Balancing this consideration is that many of these bodies have a European and/or international profile and are consequently not purely UK-focused. A second consideration was that some professions have fewer professional bodies than others, or perhaps a professional body has less of an impact on the sector than others. We were able to identify more professional bodies within engineering ( $n = 8$ ), compared to only the professional bodies for surveying ( $n = 3$ ). This may in part be due to the professional bodies in surveying providing a highly comprehensive, sector-renowned service, or because engineering is divisible into many more facets, each with its own respective body. Perhaps there are simply more engineers to support the creation of additional bodies; without further research, it is not possible to confirm why we found this. Additionally, not all professional bodies make their competency documents publicly accessible online, which made the identification of competency standards in professional body documentation more challenging. For those that do, partners were asked to retrieve and provide links to the documentation. Where they do not, there was a clear opportunity for more subjective outcomes.

## 2.2. Stage 2—Built Environment Professional Competencies

From the accessible professional body documents, a list of competencies expected to be displayed for accreditation within the professions was identified (summarised in Table 1; full summary in Appendix B). In some cases, this was a relatively straightforward task. For example, the RICS lists eleven competencies on three levels it considers ‘mandatory’ for surveyors [20], and we could include these verbatim in our mapping. Similarly, the RIBA includes three sets of mandatory competencies in its Education and Professional Development Framework [21] that must be met by architects to be competent to practice and to provide public assurance. This proved a more difficult task for some of the other professions, particularly outside of the UK, where documents were subjected to an in-depth analysis for expected professional competencies. Guidance on how to perform this successfully is provided by [22]. A similar pathway of reviewing each professional document was adopted in identifying and listing the competency expected, verifying that it did represent a professional competency, and finally grouping it with conceptually other, similar competencies to avoid duplication.

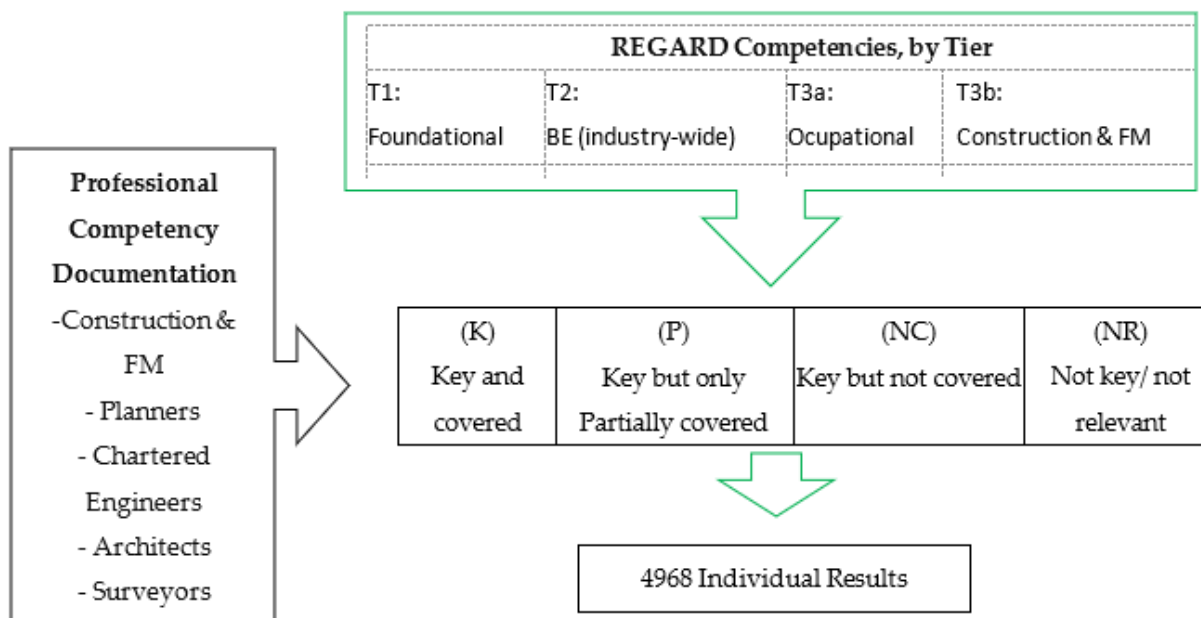
**Table 1.** Summary of Professional Competencies Included in Professional Accrediting Bodies’ Documentation (see Appendix B for detail).

Professional Category	Competencies Highlighted in Professional Body Documents
Construction and FM	<div style="text-align: center;">Theme</div> <hr style="border: 0; border-top: 1px solid black; width: 100%;"/> <div style="text-align: center;">Competencies</div>
Planners	
Chartered Engineers	
Architects (RIBA Mandatory Competencies)	
Surveyors (RICS Mandatory Competencies)	

## 2.3. Stage 3—Mapping Exercise: BE Professional Competencies and REGARD Competencies

The third stage was to conduct an audit against competencies identified in the professional body documentation (Appendix B) vs. the previously identified REGARD competency framework (Figure 1). This audit was carried out as a mapping exercise to examine which REGARD professional competencies are currently covered (or not) in professional documentation, and the extent of that provision if covered (Figure 3). Therefore, mapping identified whether each individual REGARD framework competency was (Figure 3):

- A key competency in any of the built environment professional competencies and fully covered by professional documentation (K);
- Key but only partially covered (P) in the professional documentation;
- A relevant key competency, but not covered by the documentation (NC);
- Neither key nor relevant to the accreditation of that professional competency (NR).



**Figure 3.** Mapping Competencies in Professional Body Documentation with REGARD Competencies.

There are 72 individual competencies in the REGARD competency framework, and the review of professional documentation recognised 69 competencies. The audit, therefore, had to consider 4968 ( $72 \times 69$ ) individual points of comparison. These points were mapped using Microsoft Excel to create a cross-tabulation of the results.

#### 2.4. Stage 4—Analysis of Mapping Results

Once the two sets of competencies had been mapped and cross-tabulated, the results showed how many of each of the four possible outcomes each REGARD competency received. It was decided that if a REGARD competency was identified as ‘Key and Covered’ (K) within at least one professional competency, this was sufficient to say that it is a key competency within the documentation for that particular professional role and has already been covered well in the context of rebuilding after displacement (i.e., REGARD context). For example, for the REGARD framework competency on ‘Causes, contexts, and dynamics of mass displacement’, we identified in the Construction and Facilities Management professional documentation that it was a competency covered in the documentation for “Planning and Organising Work” (the first of the 12 competencies identified for Construction and FM professionals). Therefore, we considered this REGARD competency a key area for that professional role that has already been covered in the documentation. This was regardless of the remaining 11 points of mapping in that competency as it would not be beholden on a professional body to repeat the competency multiple times; however, they may do so if the competency was relevant to different aspects of accreditation. Where we identified that the REGARD competency had no ‘Key and Covered’ results for that professional role documentation, we identified the number of results that were ‘Key and Partially Covered’ (P) and ‘Key but Not Covered’ (NC). A REGARD competency was only considered ‘Not Key/Not Relevant’ (NR) if it was not covered and not considered relevant to every part of the documentation covering expected professional competencies (100% ‘NR’ throughout that professional role’s documentation).

It is important to emphasise that this was a comparison of professional body documentation competencies that were mapped against REGARD competencies, and not an assessment of the competency of a population of built environment professionals. We are directly addressing the competencies that the built environment industry bodies specify for members in relation to what we know to be the needs of rebuilding after displacement.

Additionally, the results that are derived from the mapping exercise should not be interpreted as any one profession displaying greater competency in either general terms, or specifically to the rebuilding after displacement setting. It is simply that in relation to the REGARD competency framework, there are different levels of relevance to varying built environment professional roles and different provisions provided by their documentation.

### 3. Results and Discussion

Overall, the position for the built environment sector is encouraging in terms of expected competencies in relation to rebuilding after displacement. There are no REGARD competencies that are ‘Not Key and Not Relevant’ (NR) for every professional competency in every professional category, so every REGARD competency in the framework has some significance for at least one built environment professional role. There are 50 REGARD competencies that have ‘Key and Covered’ (K) values for at least one professional competency included in the professional documentation representing almost seventy percent of the total. This is a key finding that shows that the professional documentation has already identified the importance of REGARD competencies of built environment professionals in the context of rebuilding after displacement. The 22 competencies in the REGARD framework that have no ‘Key and Covered’ (K) value for all the documented competencies in professional roles do have Key and Partially Covered (P) and/or Key but Not Covered (NC) results. These may represent an opportunity for skills development with respect to documentation relating to rebuilding after displacement for at least one, a few, or all built environment professional roles.

A summary of all professional categories is presented below in Figures 4–7, for REGARD competences by Tier 1, 2, 3a, and 3b, respectively.

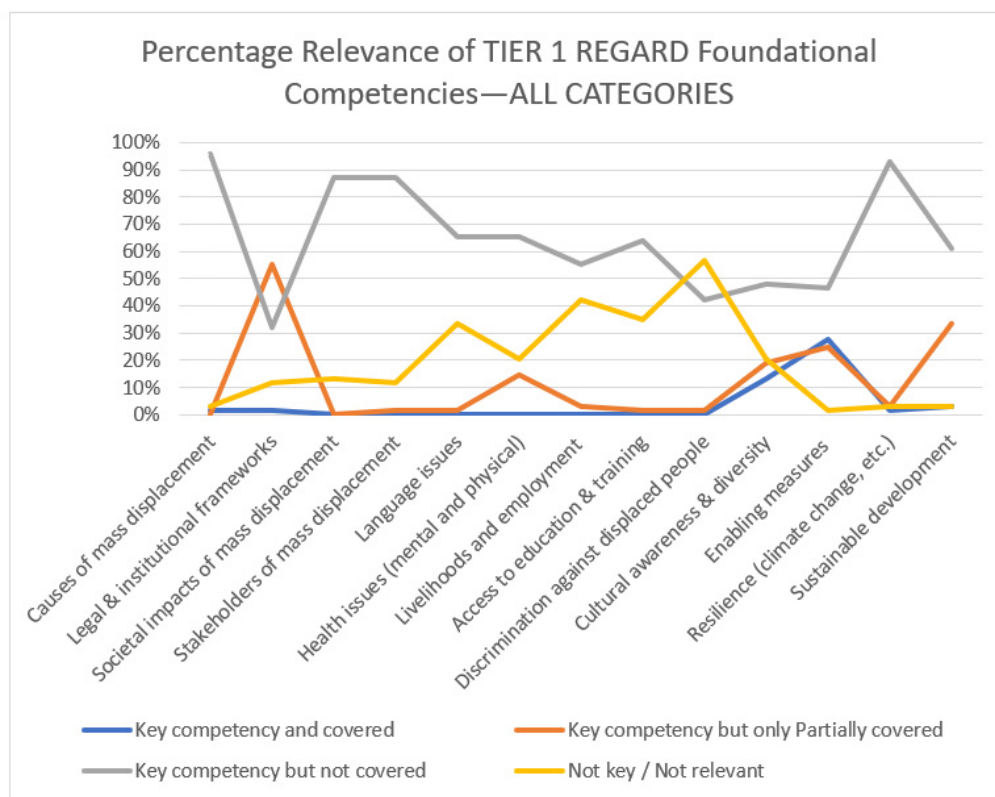


Figure 4. Relevance of Tier 1 REGARD Competences.



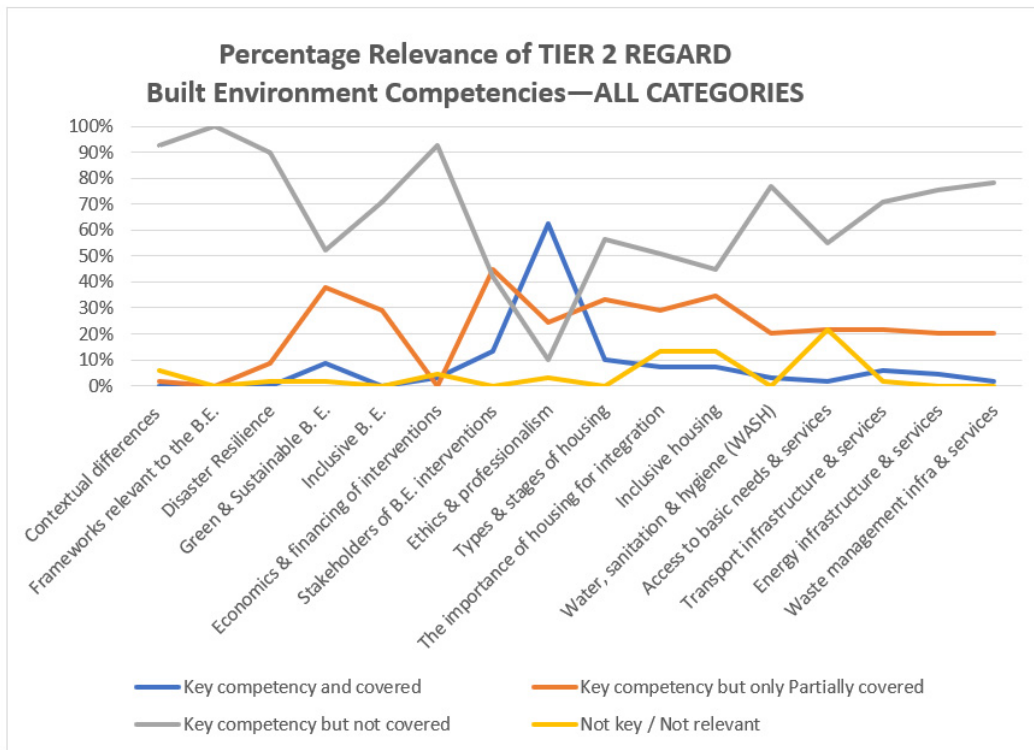


Figure 5. Relevance of Tier 2 REGARD Competences.

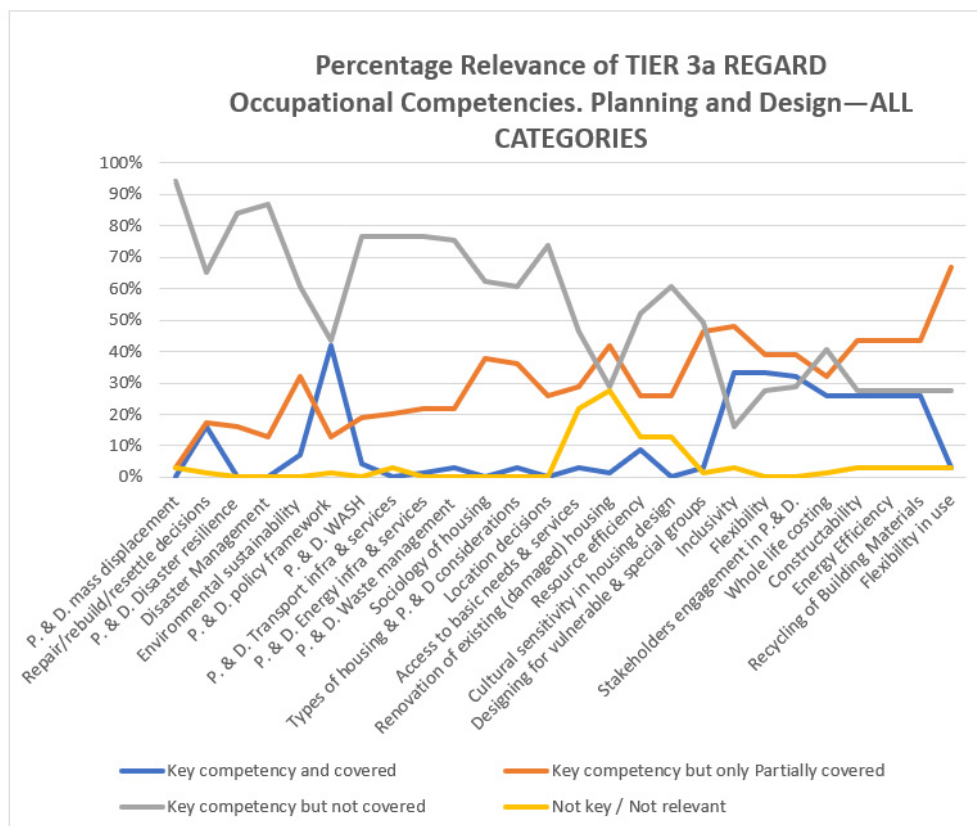
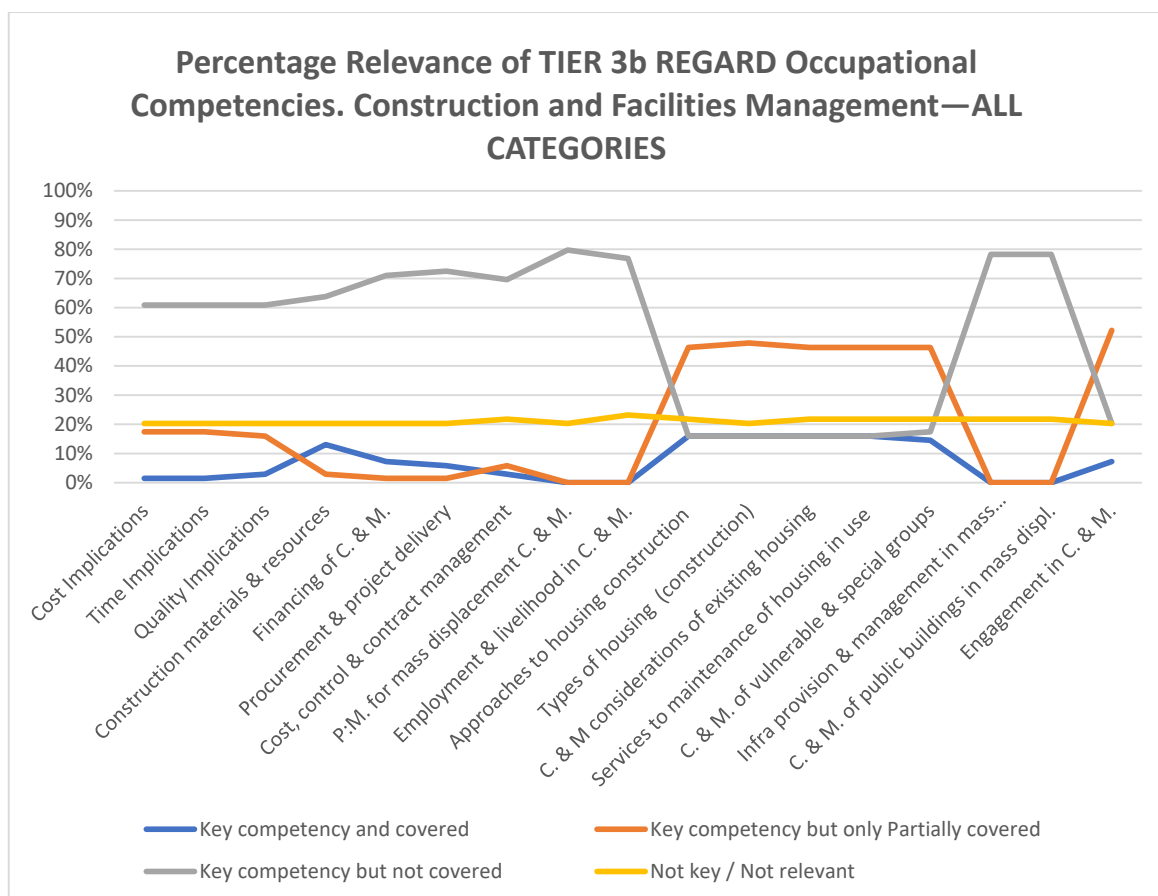


Figure 6. Relevance of Tier 3a REGARD Competences.



**Figure 7.** Relevance of Tier 3b REGARD competences.

### 3.1. Positive Outcomes

Seven of the twenty-two competencies in the REGARD framework which are not ‘Key and Covered’ (K) for any built environment professional are in Tier 1 of the framework. This is significant because this tier of 13 competencies is the tier that is not exclusive to the built environment and simply stipulates an interest in mass displacement for a positive result. Tier 1 could be used by any sector that is seeking to build capacity in the ability to respond to mass displacement episodes. Clearly, the built environment profession must be broader than this important yet specialist consideration, and their documentation must reflect that there is a need for highly competent professionals whose roles do not require them to take an interest in mass displacement. Consequently, if negative results are evident in the audit, it is desirable that they are in Tier 1/REGARD framework mapping.

The seven REGARD competencies with no ‘Key and Covered’ (K) value for any built environment professional were: Societal impacts of mass displacement, stakeholders of mass displacement and their characteristics, language issues, health issues (mental and physical), livelihoods and employment (including access to means, land, etc.), access to education and training, and addressing discrimination against displaced people. Further analysis of this latter group of Tier 1 REGARD competencies revealed that only one of these without a (K) value, societal impacts of mass displacement, did not have the next most preferred outcome of ‘Key and Partially Covered’ (P) in the audit (Table 2). In addition, there were six REGARD competencies in Tier 1 with the most positive outcome of ‘Key and Covered’ (K) from the mapping exercise; causes, contents, and dynamics of mass displacement; legal, policy, and institutional frameworks; cultural awareness and diversity; enabling measures; resilience; and sustainable development. This means that twelve Tier 1 competencies were identified by our audit of the built environment documentation

as either ‘Key and Covered’ (K) or ‘Key and Partially Covered’ (P) for rebuilding after displacement, which is a highly positive indication of industry interest in the subject.

**Table 2.** Positive Outcomes from the Mapping Audit.

	Highest Mapping Audit Result ( <i>n</i> =)			
	Key and Covered (K)	Key and Partially Covered (P)	Key but Not Covered (NC)	Not Key/Not Relevant (NR)
Tier 1 ( <i>N</i> = 13)	6	6	1	0
Tier 2 ( <i>N</i> = 16)	12	3	1	0
Tier 3a ( <i>N</i> = 26)	19	7	0	0
Tier 3b ( <i>N</i> = 17)	13	0	4	0

Of Tier 2’s 16 REGARD competencies, there were only four with no ‘Key and Covered’ (K) value: contextual differences (causes, scales, and dynamics of displacement, industrialised versus developing countries, etc.); policy, legal, and regulatory frameworks relevant to the built environment (e.g., land issues, regional and local strategies, building codes, etc.); disaster resilience (including multi-hazard mapping and the Build Back Better agenda), and inclusive built environment (including supporting vulnerable and special needs groups). Only one of these; policy, legal and regulatory frameworks relevant to the built environment; did not have the ‘Key and Partially Covered’ (P) outcome for at least one point of mapping; every mapped point was found to be ‘Key but Not Covered’ (NC), which represents an opportunity for the development of the documentation. There was only one profession for which we did not find a ‘Key and Covered’ (K) point for in Tier 2: Planners. This is possibly attributable to the relatively few documents we could identify for the planning profession making for a higher percentage (73%) of ‘Key but Not Covered’ (NC) results in that group compared with the other four professions and reducing the overall potential for more positive results.

Within Tier 3a, covering Planning and Design, there are 26 REGARD competencies. From these, seven REGARD competencies were mapped with no ‘Key and Covered’ (K) value in the documentation: how planning and design can alleviate mass displacement challenges, disaster resilience, disaster management, transport infrastructure and services, sociology of housing, location decisions, and cultural sensitivity in housing design. All of these had multiple points mapped with the ‘Key and Partially Covered’ (P) value instead, which indicates at least a keen interest and some inclusion in the sector. The high number of positive results was largely due to these REGARD competencies being closely aligned to Construction and Facilities Management, Architect, and Surveyor professional competency documentation. Despite this being the Planning and Design tier, Planners again registered no ‘Key and Covered’ (K) values. This reinforced the feeling that a relatively small collection of documentation could have adversely impacted the results from this profession.

Tier 3b in Construction and Facilities Management included four REGARD competencies with no ‘Key and Covered’ (K) value from its total of 17 competencies: project management considerations for mass displacement construction and maintenance contexts, employment and livelihood opportunities in construction and maintenance, infrastructure provision and management in mass displacement contexts, and construction and maintenance of public buildings and spaces in mass displacement contexts. Unusually for the results seen up until this point, none of these four competencies had any ‘Key and Partially Covered’ (P) values mapped either. There were, however, effectively only four professional roles to map these REGARD competencies against because the entire tier was identified as ‘Not Key/Not Relevant’ (NR) for Planners. Consequently, to have 13 REGARD competencies where there was a ‘Key and Covered’ (K) value is highly encouraging for the built environment sector seeking to assist with rebuilding after displacement.

### 3.2. Negative Considerations

Most results (mean = 59%) from the mapping audit are categorised as ‘Key but Not Covered’ (NC) (Table 3). There are currently fewer ‘Key and Partially Covered’ (P) results than ‘Key but Not Covered’ (NC) results mapped across all professions and REGARD competency framework tiers, with the sole exception of Tier 3a and the Surveyor professional competency documentation. This suggests scope for the development of the professional documentation to reflect the competencies identified as required by the REGARD framework. Even if some of the documentation was developed so that ‘Key but Not Covered’ results were updated to be ‘Key and Partially Covered’ results (if not fully to ‘Key and Covered’ results), that would be a positive outcome. Of relevance is that across the entirety of Tiers 3a and 3b, REGARD competency matches are reliant on the Construction and Facilities Management and the Surveyor professional role documentation to provide the majority of ‘Key and Covered’ (K) matches. The other three professional roles contribute zero or very few of these results (Planners 0%, Chartered Engineers 0%, Architects 4%) despite these competencies being identified in the REGARD framework as “relevant to professionals and practitioners in built environment occupations and roles”.

**Table 3.** Negative Outcomes from the Mapping Audit.

	<b>Result of Each Point of Mapping Audit (%)</b>			
	<b>Key and Covered (K)</b>	<b>Key and Partially Covered (P)</b>	<b>Key but Not Covered (NC)</b>	<b>Not Key/Not Relevant (NR)</b>
Tier 1	4	13	65	18
Tier 2	8	21	66	5
Tier 3a	13	31	53	3
Tier 3b	8	18	53	21

As was acknowledged at the beginning of this research, it is not essential that every REGARD framework competency is matched positively with every professional documentation competency. It is sufficient to identify that in one of the profession’s competencies there is a ‘Key and Covered’ (K) match, if indeed mass displacement is a subject of interest to the professional. Consequently, these data are useful for contextual purposes and an indication of how the built environment profession might like to develop additional consideration for rebuilding after displacement, but it does not signify problems in the sector.

### 3.3. Criticality Analysis

To better examine the coverage afforded to each REGARD competency by professional documentation, we undertook a criticality analysis of each result (Appendix C). A value of 3, 2, 1, or 0 was assigned according to the level of criticality of the possible results: 3 for ‘Key and Covered’ (K); 2 for ‘Key and Partially Covered’ (P); 1 for ‘Key but not Covered’ (NC); and finally, 0 for ‘Not Key and Not Relevant’ (NR). These values were then summed by professional role, for each REGARD competency, with the result being divided by the maximum possible value, achieved if all the results were identified as (K). For example, Construction and Facilities Management professional documentation has 12 competencies, so the maximum value for any single REGARD competency would be 36. The actual sum of Construction and Facilities Management results for the REGARD competency “Causes, contents and dynamics of mass displacement” was 13, so 13 divided by the maximum value of 36 gives a result of 36.1% (rank 53, Construction and FM column in Appendix C).

The weighted average of each REGARD competency was obtained, applying the same process to all professional role results for that competency. There are 69 professional competencies across the five professional roles, each carrying a maximum individual

mapping result of 3, which provides a maximum possible sum of 207 for each REGARD competency. For the REGARD competency “Causes, contents and dynamics of mass displacement”, the sum of all the points of mapping was 69. This 69 was divided by 207 to give the weighted average of 33.33%.

The weighted average allows us to globally rank all the REGARD competencies to identify where the greatest level of coverage exists for rebuilding after mass displacement in the built environment sector, and where development may be considered, not only globally but by profession.

There is a large variation between the highest weighted average of 82.13% (Ethics and Professionalism) and 14.98% (Addressing Discrimination Against Displaced People) (Appendix C). Tier 1 REGARD competencies tend to occupy lower ranks in the analysis, and lower weighted averages. Industry-wide built environment competencies (Tier 2) and occupational competencies (Tiers 3a and 3b) score more highly, with Tier 3a’s planning and design competencies occupying eight of the highest ten rankings (Figure 8). Clearly, this result is influenced by the high scoring of the Construction and Facilities Management professional role in Tier 3a. Only for one (planning and design policy, legal and regulatory framework) of the Tier 3a competencies in the highest ten rankings is the result for the profession less than 100%. This position is supported by the positive mapping of the surveyor profession with this tier of competencies, showing a result always above 78%, and on half the calculations above 90%. Notably, the planning profession does not score so highly, an unexpected result given that Tier 3a of the REGARD competencies covers “Planning and Design”. That they are considerably distant from the other professions in the results suggests there may be differences in the profession’s relative involvement in work relating to displacement, their approach to their documentation, or perhaps simply that fewer professional planning bodies and documents exist from which to draw competencies.

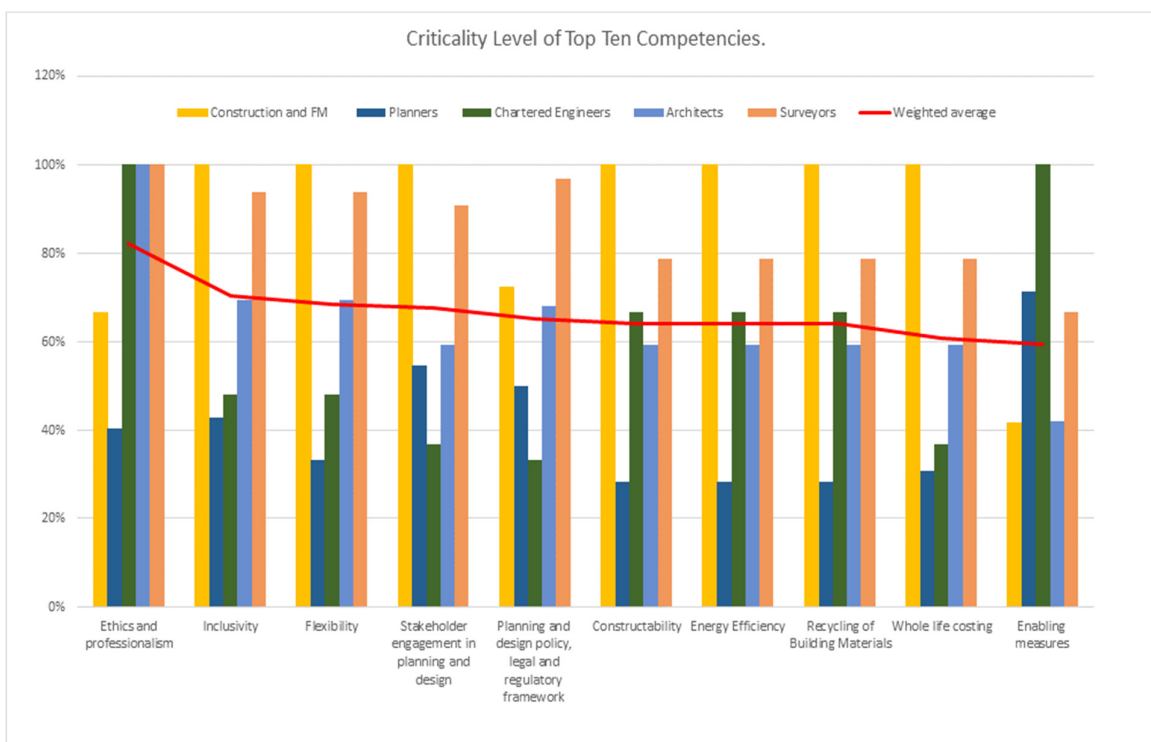


Figure 8. Criticality Analysis of REGARD Competencies: Highest Ten Results.

#### 4. Conclusions

This audit has shown both strengths and weaknesses in the existing professional competency documentation of the built environment sector in relation to mass displacement events and the rebuilding of communities. Given the scope of the REGARD project, we aggregated our results by profession rather than country, but there are clearly national differences in the provision of information on competency expectations, as witnessed by the different volumes of documentation. Consequently, this scoping exercise could be used as a template for the study of an individual nation's built environment sector competency towards the REGARD framework. The research could also be applied to geographical areas where the risk of natural hazards, conflict, and potential for displacement is acute. Additionally, there are more generic documented skills that may be included, such as project management competencies (for example, those advised by the Project Management Institute). The opportunity to identify whether a sector, nation, and/or region can sustain and respond positively to mass displacement events is evident.

It was highlighted that the Tier 1 results would be lower where the built environment professional role has limited, or no, interest in the subject of displacement. However, that displacement is a global problem, and one that is increasing in scope, requires the professions in the sector to develop an interest if one does not already exist. The results of Tier 1 of the REGARD framework comparison with professional documentation show that built environment professionals in general could benefit from an understanding and appreciation of displacement events and their impact on the people at the centre of the problems. These include considerations that may not otherwise be thought of as built environment issues, such as language barriers, discrimination, and access to education and training. It was noted that the REGARD framework was deliberately delineated, particularly in the separation of Tier 3 into 'Planning and Design' and 'Construction and Facilities Management' sub-tiers. However, there are relationships between the competencies of the REGARD framework that call for a more holistic approach. Access to the different services displaced persons require can be complicated and interconnected. Determining that an entire sub-tier of competencies is of no relevance to a profession is potentially limiting the capacity for future solutions. That said, the built environment sector is, according to our results, currently well-placed to respond to the need for competency development, and there are many strengths within and between professions. Appropriate additions to competency documentation and expectations would see this strength grow and contribute to the response to one of the major challenges of our era.

**Author Contributions:** Conceptualization, A.C., F.V.-R. and C.L.; methodology, A.C., F.V.-R. and C.L.; validation, A.C., F.V.-R. and C.L.; formal analysis, F.V.-R.; investigation, A.C., F.V.-R. and C.L.; resources, A.C., F.V.-R. and C.L.; data curation, F.V.-R.; writing—original draft preparation, A.C.; writing—review and editing, A.C., F.V.-R. and C.L.; visualization, F.V.-R.; supervision, C.L.; project administration, C.L.; funding acquisition, C.L. All authors have read and agreed to the published version of the manuscript.

**Funding:** The REGARD Project has been co-funded by the Erasmus+ Programme of the European Commission.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** The original data of this paper were obtained by the authors' analysis of the identified documentation.

**Conflicts of Interest:** The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

## Appendix A

**Table A1.** Accrediting professional bodies in REGARD partner nations.

Category	BE Professionals	Professional Bodies	UK/EU	Int'l Presence	Document Availability	Online Document Link
UK						
Surveying	Quantity Surveyors	RICS—Royal Institution of Chartered surveyors	✓	✓	✓	<a href="https://www.rics.org/globalassets/rics-website/media/qualify/pathway-guides/pathway-guides-requirements-and-competencies-v1.3-oct-2018.pdf">https://www.rics.org/globalassets/rics-website/media/qualify/pathway-guides/pathway-guides-requirements-and-competencies-v1.3-oct-2018.pdf</a>
Surveying	Civil Engineering Surveyors	The Chartered Institution of Civil Engineering Surveyors (CICES)	✓	✓	✓	<a href="https://www.cices.org/membership/about/competencies/">https://www.cices.org/membership/about/competencies/</a>
Design	Architects	RIBA—Royal Institute of British Architects	✓	✓	✓	Think-Architecture-PDF.pdf
Design	Architects	Chartered Institute of Architectural Technologies (CIAT)	✓	✓	✓	<a href="https://architecturaltechnology.com/uploads/assets/uploaded/2901cf7f-8ff5-47d2-9b40fb5ad8d3814a.pdf">https://architecturaltechnology.com/uploads/assets/uploaded/2901cf7f-8ff5-47d2-9b40fb5ad8d3814a.pdf</a>
Design	Architects	The Association of Consultant Architects (ACA)	x	x	✓	CIAT Requirements for Registration: CIAT Chartered Practices ( <a href="http://architecturaltechnology.com">architecturaltechnology.com</a> )
Design	Landscape Architects	The Landscape Institute (LI)	x	x	x	<a href="https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2020/12/LI-Entry-Standards-and-Competency-Framework-Additional-Landscape-Competencies.pdf">https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2020/12/LI-Entry-Standards-and-Competency-Framework-Additional-Landscape-Competencies.pdf</a>
Design	Urban Design	Urban Design Group	x	x	x	Urban Design Group ( <a href="http://udg.org.uk">udg.org.uk</a> )
Design	Interior Architect	Chartered Society of Designers	✓	✓	✓	<a href="https://www.csd.org.uk/content/uploads/2015/10/PATHWAY-TO-CHARTERED-DESIGNER-GUIDANCE.pdf">https://www.csd.org.uk/content/uploads/2015/10/PATHWAY-TO-CHARTERED-DESIGNER-GUIDANCE.pdf</a>
Design	Town Planner	RTPI—Royal Town Planning Institute	x	✓	✓	<a href="https://www.rtpi.org.uk/media/2052/rtpi-2019-membership-guidance-summary-of-changes-june-2019-edit.docx">https://www.rtpi.org.uk/media/2052/rtpi-2019-membership-guidance-summary-of-changes-june-2019-edit.docx</a>
Construction	Builders	CIOB—Chartered Institute of Building	✓	✓	✓	Industry PR Guidance Notes.pdf ( <a href="http://ciob.org">ciob.org</a> )

Engineering	Civil Engineer	ICE—Institute of Civil Engineers	✓	✓	Varies	Varies
Engineering	Structural Engineer	IStructE—The Institutions of Structural Engineers	✓	✓	✓	<a href="https://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf">https://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf</a>
Engineering	Building Services Engineer	Chartered Institute of Building Services Engineer	x	✓	✓	<a href="https://www.cibse.org/getmedia/7c84096b-6a31-439a-9551-2d0af0200023/Factsheet-M21.pdf.aspx">https://www.cibse.org/getmedia/7c84096b-6a31-439a-9551-2d0af0200023/Factsheet-M21.pdf.aspx</a>
Engineering		CIPHE—Chartered Institute of Plumbing and Heating Engineering	x	x	✓	<a href="https://www.cibse.org/getmedia/4ddec097-de4a-4875-90aed7a69bd67ce3/Factsheet-F21.pdf.aspx">https://www.cibse.org/getmedia/4ddec097-de4a-4875-90aed7a69bd67ce3/Factsheet-F21.pdf.aspx</a>
Engineering	Water and Environmental Management Professionals	CIWEM—Chartered Institution of Water and Environmental Management	x	x	✓	<a href="https://www.ciwem.org/assets/pdf/Membership/Application%20Guidance/C.WEM%20MC%20Guidance.pdf">https://www.ciwem.org/assets/pdf/Membership/Application%20Guidance/C.WEM%20MC%20Guidance.pdf</a>
Engineering	Wastes Management Professionals	Chartered Institution of Wastes Management	x	x	✓	<a href="https://rise.articulate.com/share/v7zQhnENPeTuk9nGmb0YhpLrqm2LLrsN#/">https://rise.articulate.com/share/v7zQhnENPeTuk9nGmb0YhpLrqm2LLrsN#/#</a>
Engineering	Materials, Minerals and Mining Engineers	The Institute of Materials, Minerals and Mining (IOM3)	✓	✓	✓	<a href="https://www.iom3.org/resource/guide-to-ceng-cenv-and-csci-2020-pdf.html">https://www.iom3.org/resource/guide-to-ceng-cenv-and-csci-2020-pdf.html</a>
Management	Project Manager	APM—Association for Project Management	✓	✓	✓	<a href="https://www.apm.org.uk/media/2274/apm-competence-framework.pdf">https://www.apm.org.uk/media/2274/apm-competence-framework.pdf</a>
Management	Construction Manager	ICM—The Institute of Construction Management	x	x	✓	<a href="https://the-icm.co.uk/tag/digital-competencies-framework/">https://the-icm.co.uk/tag/digital-competencies-framework/</a>
Management	Facilities Managers	IWFM—The Institute of Workplace and Facilities Management (Former BIFM—	x	✓	x	Professional-Standards-Handbook.pdf (iwfm.org.uk)



		British Institute of Facilities Management)					
Estonia							
Design	Architects	EAA – Estonian Association of Architects under the ACE – Architects’ Council of Europe	✓	x	only in Estonian language	<a href="https://www.kutsekoda.ee/wp-content/uploads/2019/KS/Uldised-kompetentsid.pdf">https://www.kutsekoda.ee/wp-content/uploads/2019/KS/Uldised-kompetentsid.pdf</a>	
Design	Landscape Architects	Estonian Landscape Architects’ Union under IFLA – the International Federation of Landscape Architects	✓	✓		✓	190413 IFLA Europe Membership Application_Guidelines_CBr
Design	Spatial Planner	EAP – The Estonian Association of Planners	✓	✓		✓	<a href="http://www.planeerijad.ee/doc/ruumilise-keskkonna-planeerija-kutse-materjalid/194-hindamisstandard-2017/file">http://www.planeerijad.ee/doc/ruumilise-keskkonna-planeerija-kutse-materjalid/194-hindamisstandard-2017/file</a>
Construction Professional	Builders	Estonian Association of Construction Entrepreneurs	x	x		✓	<a href="http://eel.ee/kutse-andmine/ehituse-kutseala-kutseomistamise-kord/">http://eel.ee/kutse-andmine/ehituse-kutseala-kutseomistamise-kord/</a>
Engineering	Civil Engineer	EEL – The Estonian Association of Civil Engineers	✓	x		✓	<a href="http://www.kutseracco/ctrl/en/KAO/vaata/10086630">http://www.kutseracco/ctrl/en/KAO/vaata/10086630</a>
Management	Project Manager	EPMA – Estonian Project Management Association	x	✓		✓	<a href="https://shop.ipma.world/?v=79cba1185463">https://shop.ipma.world/?v=79cba1185463</a>
Sweden							
Design	Architects	Sveriges Arkitekter (Architects Sweden)	✓	✓		✓	190413 IFLA Europe Membership Application_Guidelines_CBr
Design	Landscape Architects	Sveriges Arkitekter (Architects Sweden)	✓	✓		✓	190413 IFLA Europe Membership Application_Guidelines_CBr

Design	Interior Architect	Sveriges Arkitekter (Architects Sweden)	✓	✓	✓	190413 IFLA Europe Membership Application_Guidelines_CBr
Management	Project Manager	SPMA – The Swedish Project Management Association, under the IPMA – International Project Management Association	✓	✓	✓	<a href="https://shop.ipma.world/?v=79cba1185463">https://shop.ipma.world/?v=79cba1185463</a>
Management	Facilities Managers	IFMA – International Facilities Management Association	✓	✓	✓	<a href="https://ifmacdn.azureedge.net/sfcdn/docs/default-source/marketing/pd-pages/11-core-competencies_oct2020.pdf?sfvrsn=2">https://ifmacdn.azureedge.net/sfcdn/docs/default-source/marketing/pd-pages/11-core-competencies_oct2020.pdf?sfvrsn=2</a>
Sri Lanka						
Surveying	Quantity Surveyors	IQSSL – Institute of Quantity Surveyors Sri Lanka	x	x	✓	CPD Guide of IQSSL-Institute of Quantity Surveyors Sri Lanka-Official Website
Engineering	Structural Engineer	Society of Structural Engineers – Sri Lanka (SSESL)	x	x	✓	Application Form Fellow Member.pdf (ssesl.lk)
Engineering	Building Services Engineer	The Institution of Engineers	x	x	✓	PROFESSIONAL REVIEW RULES (iesl.lk)

Note: Tick (yes); x (no). Accessed date for documentation is 14 December 2021.

## Appendix B

**Table A2.** Professional competencies included in professional accrediting body documentation.

Professional Category	Competencies Highlighted in Professional Body Documents	
	Theme	Competencies
Construction and FM	Occupational Competence	Planning and organising work
		Managing health, safety, and welfare/well-being
		Managing quality
		Sustainable and environmental practices in construction
		Knowledge of commercial, contractual, and legal issues
	Management Competence	Communication
		Decision-making
		Managing information
		Strategic management/financial management
		Developing people and teams
Commitment to Professionalism	Innovation	
Planners	Capacity Check: Knowledge and Skills	Commitment to professionalism
		Foundations of urban design
		Urban Design Topics: Form and context
		Urban Design Topics: People
		Urban Design Topics: Servicing
	Capacity Check: Roles in Urban Design	Urban Design Topics: Management
		Carrying out urban design studies and appraisals
		Preparing urban design policy, guidance, and statements
		Masterplanning
		Designing
Chartered Engineers	(A) Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology.	Communicating design in two dimensions (by hand or computer)
		Communicating design in three dimensions (by hand or computer)
		Providing urban design advice
		Managing urban design processes
		Promoting placemaking
	(B) Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.	(A1) Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology.
		(A2) Engage in the creative and innovative development of engineering technology and continuous improvement systems.
		(B1) Identify potential projects and opportunities.
		(B2) Conduct appropriate research and undertake design and development of engineering solutions.
		(B3) Manage implementation of design solutions and evaluate their effectiveness.
(C) Provide technical and commercial leadership.	(C1) Plan for effective project implementation.	
	(C2) Plan, budget, organise, direct and control tasks, people and resources.	
	(C3) Lead teams and develop staff to meet changing technical and managerial needs.	

		(C4) Bring about continuous improvement through quality management.
		Global and built environment climate fundamentals
		Climate fundamentals
		Financial risks and net zero economy
		Environmental impacts of the built environment
		Sustainable urbanism, architecture, and engineering
		Built environment policy, legislation, regulations, commitments, benchmarks, and construction industry guidance
		RIBA Sustainable Outcomes and common threads
		RIBA Sustainable Outcomes Guide: outcome-based briefing and design, plan for use, soft landings, and post-occupancy evaluation
		Retrofit, adaptation, and reuse
		Planning for climate extremes, disaster risk, resilience, redundancy, and adaptation
		Life-cycle costing, investment, and procurement
		Research and innovation
		Human factors
		Health and wellbeing
		Communities, interconnectivity, and inclusion
		Social value
		Biophilic and sensory design
		User experience design and occupancy behaviour
Architects (RIBA Mandatory Competencies)	RIBA Climate Literacy Knowledge Schedule	Circular economy
		Resource efficiency and geographic implications
		Designing for change (flexibility and adaptability) and regeneration
		Environmental and health impacts of materials and waste
		Waste as a resource
		Responsible and ethical sourcing
		Energy and carbon
		Passive design
		Active design
		Whole life carbon (for retrofit and new build): modelling, carbon assessments, and iterative design process
		Offsetting
		Operational energy and carbon, modelling and technology
		Ecology and biodiversity
		Biodiversity and net gain
		Nature-based solutions
		Land use and building density
		Bio-regional urbanism and design
		Urban farming and sustainable food production
		Water
		Water cycle, demand, supply, and reduction
		Water recycling and reuse
		Rainwater harvesting, stormwater management, and sustainable urban drainage

	<p>Water pollution in (natural) aquatic habitats</p> <p>Climate change impacts (floods, droughts, and water quality)</p> <p>Connectivity and transport</p> <p>Site location</p> <p>Compact development and walkability</p> <p>Regional and local infrastructure and planning</p> <p>Low carbon transport and multimodal transportation networks</p> <p>Planning for future of transportation</p>
	<p>Ethics in practice</p> <p>History and definitions</p> <p>Recognising an ethical issue</p> <p>Virtue Ethics / Social Contract Ethics / Duty Ethics / Utilitarian Ethics</p> <p>Defining behaviours—Codes, Regulations, Sanctions and Best Practice</p> <p>The Public Interest—How it is defined and who is responsible</p> <p>The 6 duties</p>
	<p>Duty to oneself</p> <p>The codes of conduct and practice</p> <p>Principles and values</p> <p>Competence</p> <p>Continuing professional development</p> <p>Pro bono work</p> <p>Corruption</p> <p>Dilemma—A conflict of interest</p>
RIBA Ethical Practice Knowledge Schedule	<p>Duty to the Profession</p> <p>The Codes of Conduct and Practice</p> <p>Reputation and Value</p> <p>Respecting previous appointments</p> <p>Copyright and Credit</p> <p>Whistleblowing</p> <p>Research, POE and Building Performance</p> <p>Equity, Diversity, and Inclusion (including the RIBA Inclusion Charter)</p> <p>Dilemma—Competition</p>
	<p>Duty to those in the workplace</p> <p>Employment Law</p> <p>The Codes of Conduct and Practice</p> <p>Company culture</p> <p>Respecting colleagues</p> <p>Managing practice</p> <p>Equity, Diversity, and Inclusion (including the RIBA EDI Policy Guide)</p> <p>Dilemma—Workplace</p>
	<p>Duty to those Commissioning Services</p> <p>The Codes of Conduct and Practice</p> <p>Lay clients</p> <p>Experienced private clients</p> <p>Public Sector clients</p>

---

	Confidentiality
	Dilemma – Client’s best interest
	Duty to Society and the End User
	Building Regs, Housing Standards and Planning Policy
	The Codes of Conduct and Practice
	Equity, Diversity, and Inclusion (including bias and discrimination)
	Health and safety
	Modern Slavery
	Community Engagement and Regeneration
	Social Value and Social Responsibility
	Rights of Future Generations
	Dilemma – Affordable housing provision
	Duty to the Wider World
	The Codes of Conduct and Practice
	The Climate and Biodiversity emergency
	Sustainable and Regenerative design
	Supply Chains
	Rights of Nature
	Dilemma – Challenging the brief
	Resolving Ethical Issues
	Core values
	Decision making
	Lifelong learning
	Independence
	Advocacy
	Resources and toolkits
	Preparing to visit site
	Site surveys and research
	Plan of work
	Site occupation and vacant sites
	Clothing, equipment, and personal protective equipment
	Weather conditions
	First aid
	Undertaking site visits
	Lone working
	Personal site safety
	Person responsible for control of the site
RIBA Health and Life Safety Knowledge Schedule	Induction and orientation
	Safety signage
	Navigating around site
	Site vehicles and mobile plant
	Inspecting construction work
	Communication with site personnel
	Site behaviour
	Action in the event of an emergency
	Post-site-visit activity
	Site hazards
	Site assessment
	Site contamination
	Falls from height

---

		Slips and trips
		Unsafe structures
		Excavations
		Enclosed spaces
		Confined spaces
		Respiratory hazards (dust and fumes)
		Noise
		Hazardous substances
		Fire safety
		Manual handling
		Geological, man-made landscape, or hydrological features
		Flora and fauna
		Design risk management
		Principles of design risk management
		General principles of prevention
		Significant hazards and risks
		Communication and co-ordination (including meetings, residual risk registers, drawings, and models)
		Statute, Guidance and Codes of Conduct
		Statute and the regulatory environment (legislation under the Building Act and Health and Safety at Work Act)
		Statutory and non-statutory guidance
		Codes of conduct
		CDM Regulations
		Regulation 8—General duties
		Regulation 9—Designer duties
		Regulation 11—Principal Designer duties
		Pre-construction information and the health and safety file
		Principles of Fire Safety Design
		Ignition, development, and spread of fire
		Fire performance of construction materials
		Design for fire safety
		Fire safety information (Regulation 38 of the Building Regulations)
	Level 3	Ethics, rules of conduct, and professionalism
		Client care
	Level 2	Communication and negotiation
		Health and safety
		Accounting principles and procedures
		Business planning
		Conflict avoidance, management, and dispute resolution procedures
	Level 1	Data management
		Diversity, inclusion, and teamwork
		Inclusive environments
		Sustainability
Surveyors (RICS Mandatory Competencies)		

## Appendix C

Table A3. Criticality Analysis of all REGARD Competencies.

N.	Category	REGARD Competency	Weighted Average	Rank	Construction and FM	Planners	Chartered Engineers	Architects	Surveyors
21	TIER 2	Ethics and professionalism	82.13%	1	66.67%	40.48%	100.00%	100.00%	100.00%
48	TIER 3a	Inclusivity	70.53%	2	100.00%	42.86%	48.15%	69.57%	93.94%
49	TIER 3a	Flexibility	68.60%	3	100.00%	33.33%	48.15%	69.57%	93.94%
50	TIER 3a	Stakeholder engagement in planning and design	67.63%	4	100.00%	54.76%	37.04%	59.42%	90.91%
35	TIER 3a	Planning and design policy, legal and regulatory framework	65.22%	5	72.22%	50.00%	33.33%	68.12%	96.97%
52	TIER 3a	Constructability	64.25%	6	100.00%	28.57%	66.67%	59.42%	78.79%
53	TIER 3a	Energy efficiency	64.25%	7	100.00%	28.57%	66.67%	59.42%	78.79%
54	TIER 3a	Recycling of building materials	64.25%	8	100.00%	28.57%	66.67%	59.42%	78.79%
51	TIER 3a	Whole life costing	60.87%	9	100.00%	30.95%	37.04%	59.42%	78.79%
11	TIER 1	Enabling measures	59.42%	10	41.67%	71.43%	100.00%	42.03%	66.67%
20	TIER 2	Stakeholders of built environment interventions (including typical institutional frameworks)	57.00%	11	83.33%	45.24%	51.85%	56.52%	48.48%
55	TIER 3a	Flexibility in use	56.52%	12	72.22%	28.57%	66.67%	56.52%	66.67%
66	TIER 3b	Types of housing	53.14%	13	80.56%	0.00%	33.33%	68.12%	75.76%
65	TIER 3b	Approaches to housing construction	52.17%	14	75.00%	0.00%	33.33%	68.12%	75.76%



67	TIER 3b	Construction and maintenance considerations in the repair/renovation/refurbishment of existing housing	52.17%	15	75.00%	0.00%	33.33%	68.12%	75.76%
68	TIER 3b	Managing services to and maintenance of housing in use	52.17%	16	75.00%	0.00%	33.33%	68.12%	75.76%
17	TIER 2	Green and sustainable built environment (including nature-based solutions)	51.21%	17	33.33%	57.14%	66.67%	40.58%	72.73%
22	TIER 2	Types and stages of housing (emergency, temporary, transitional, permanent, resettlement, relocation, social housing, etc.)	51.21%	18	58.33%	42.86%	33.33%	52.17%	66.67%
69	TIER 3b	Consideration of vulnerable and special needs groups in housing construction and maintenance	51.21%	19	69.44%	0.00%	33.33%	68.12%	75.76%
47	TIER 3a	Designing for vulnerable and special needs groups	50.24%	20	58.33%	30.95%	33.33%	56.52%	66.67%
31	TIER 3a	Repair/rebuild/resettle decisions	49.28%	21	69.44%	30.95%	33.33%	33.33%	96.97%
2	TIER 1	Legal, policy, and institutional frameworks	48.79%	22	44.44%	50.00%	62.96%	36.23%	66.67%
34	TIER 3a	Environmental sustainability	48.79%	23	44.44%	52.38%	33.33%	44.93%	69.70%
72	TIER 3b	Stakeholder engagement in construction and maintenance	48.79%	24	66.67%	0.00%	33.33%	66.67%	66.67%
41	TIER 3a	Types of housing and their specific planning and design considerations	47.34%	25	58.33%	33.33%	33.33%	46.38%	66.67%
40	TIER 3a	Sociology of housing	45.89%	26	33.33%	33.33%	33.33%	55.07%	66.67%
13	TIER 1	Sustainable development	45.41%	27	44.44%	54.76%	51.85%	37.68%	45.45%
24	TIER 2	Inclusive housing (including supporting vulnerable and special-needs groups)	45.41%	28	47.22%	45.24%	0.00%	52.17%	66.67%
27	TIER 2	Transport infrastructure and services	43.96%	29	38.89%	38.10%	33.33%	50.72%	51.52%
23	TIER 2	The importance of housing (for social cohesion and integration, livelihoods, etc.)	43.48%	30	44.44%	38.10%	0.00%	52.17%	66.67%
45	TIER 3a	Resource efficiency (including materials, labour, equipment, etc.)	43.48%	31	50.00%	11.90%	33.33%	52.17%	66.67%

18	TIER 2	Inclusive built environment (including supporting vulnerable and special-needs groups)	43.00%	32	36.11%	50.00%	33.33%	46.38%	42.42%
28	TIER 2	Energy infrastructure and services	43.00%	33	47.22%	40.48%	33.33%	46.38%	42.42%
36	TIER 3a	Water supply, sanitation, and hygiene (WASH)	42.51%	34	50.00%	38.10%	33.33%	37.68%	57.58%
39	TIER 3a	Waste management	42.51%	35	47.22%	40.48%	33.33%	37.68%	57.58%
25	TIER 2	Water supply, sanitation, and hygiene (WASH)	42.03%	36	50.00%	38.10%	33.33%	44.93%	39.39%
42	TIER 3a	Location decisions	42.03%	37	33.33%	33.33%	33.33%	43.48%	66.67%
10	TIER 1	Cultural awareness and diversity	41.55%	38	30.56%	73.81%	22.22%	23.19%	66.67%
38	TIER 3a	Energy infrastructure and services	41.55%	39	47.22%	40.48%	33.33%	34.78%	57.58%
29	TIER 2	Waste management infrastructure and services (including drainage, wastewater treatment, reuse and recycling of materials, etc.)	41.06%	40	47.22%	40.48%	33.33%	43.48%	36.36%
37	TIER 3a	Transport infrastructure and services	39.13%	41	38.89%	38.10%	33.33%	33.33%	57.58%
44	TIER 3a	Repair/renovation/refurbishment of existing (damaged) housing	39.13%	42	69.44%	2.38%	33.33%	34.78%	66.67%
32	TIER 3a	Disaster resilience	38.65%	43	38.89%	33.33%	33.33%	33.33%	60.61%
33	TIER 3a	Disaster management	37.68%	44	33.33%	33.33%	33.33%	33.33%	60.61%
43	TIER 3a	Access to basic needs and services	37.68%	45	27.78%	33.33%	0.00%	46.38%	66.67%
46	TIER 3a	Cultural sensitivity in housing design	37.68%	46	33.33%	11.90%	33.33%	43.48%	66.67%
59	TIER 3b	Construction materials and resources	36.23%	47	86.11%	0.00%	37.04%	33.33%	33.33%
16	TIER 2	Disaster resilience (including multi-hazard mapping, Build Back Better)	35.75%	48	33.33%	45.24%	33.33%	33.33%	33.33%

12	TIER 1	Resilience (disaster, climate change, etc.)	34.30%	49	38.89%	35.71%	33.33%	31.88%	33.33%
26	TIER 2	Access to basic needs and services (food, livelihoods, health, education, recreation, etc.)	34.30%	50	27.78%	38.10%	0.00%	46.38%	39.39%
19	TIER 2	Economics and financing of interventions (including cost benefit analyses, whole life costing)	33.82%	51	30.56%	28.57%	40.74%	36.23%	33.33%
58	TIER 3b	Quality implications	33.82%	52	72.22%	0.00%	37.04%	33.33%	33.33%
1	TIER 1	Causes, content, and dynamics of mass displacement	33.33%	53	36.11%	30.95%	33.33%	33.33%	33.33%
15	TIER 2	Policy, legal and regulatory frameworks relevant to the built environment (e.g., land issues, regional and local strategies, building codes, etc.)	33.33%	54	33.33%	33.33%	33.33%	33.33%	33.33%
30	TIER 3a	How planning and design can alleviate mass displacement challenges	33.33%	55	30.56%	33.33%	40.74%	31.88%	33.33%
56	TIER 3b	Cost implications	33.33%	56	69.44%	0.00%	37.04%	33.33%	33.33%
57	TIER 3b	Time implications	33.33%	57	69.44%	0.00%	37.04%	33.33%	33.33%
14	TIER 2	Contextual differences (causes, scales and dynamics of displacement, industrialised versus developing countries, etc.)	31.88%	58	27.78%	28.57%	33.33%	33.33%	36.36%
60	TIER 3b	Financing of construction and maintenance	31.88%	59	63.89%	0.00%	33.33%	33.33%	33.33%
6	TIER 1	Health issues (mental and physical)	31.40%	60	30.56%	16.67%	18.52%	44.93%	33.33%
61	TIER 3b	Procurement, contracts, and project delivery	30.92%	61	58.33%	0.00%	33.33%	33.33%	33.33%
4	TIER 1	Stakeholders of mass displacement and their characteristics	29.95%	62	33.33%	33.33%	25.93%	26.09%	33.33%
62	TIER 3b	Cost estimation, cost control, and contract management	29.95%	63	52.78%	0.00%	33.33%	33.33%	33.33%
3	TIER 1	Societal impacts of mass displacement	28.99%	64	27.78%	28.57%	22.22%	30.43%	33.33%
63	TIER 3b	Project management considerations for mass displacement construction and maintenance contexts	26.57%	65	33.33%	0.00%	33.33%	33.33%	33.33%

70	TIER 3b	Infrastructure provision and management in mass displacement contexts	26.09%	66	30.56%	0.00%	33.33%	33.33%	33.33%
71	TIER 3b	Construction and maintenance of public buildings and spaces in mass displacement contexts	26.09%	67	30.56%	0.00%	33.33%	33.33%	33.33%
64	TIER 3b	Employment and livelihood opportunities in construction and maintenance	25.60%	68	27.78%	0.00%	33.33%	33.33%	33.33%
5	TIER 1	Language issues	22.71%	69	16.67%	28.57%	11.11%	21.74%	33.33%
8	TIER 1	Access to education and training	22.22%	70	25.00%	26.19%	3.70%	20.29%	33.33%
7	TIER 1	Livelihoods and employment (including access to means, land, etc.)	20.29%	71	27.78%	30.95%	22.22%	2.90%	33.33%
9	TIER 1	Addressing discrimination against displaced people	14.98%	72	27.78%	14.29%	14.81%	0.00%	33.33%

## References

1. UNHCR Mid-Year Trends. 2021. Available online: <https://www.unhcr.org/uk/mid-year-trends.html> (accessed on 14 December 2021).
2. Araya, F.; Faust, K.M.; Kaminsky, J.A. Public perceptions from hosting communities: The impact of displaced persons on critical infrastructure. *Sustain. Cities Soc.* **2019**, *48*, 101508.
3. Malalgoda, C.; Amaratunga, D.; Haigh, R. Challenges in creating a disaster resilient built environment. *Procedia Econ. Financ.* **2014**, *18*, 736–744. [https://doi.org/10.1016/S2212-5671\(14\)00997-6](https://doi.org/10.1016/S2212-5671(14)00997-6).
4. European Union. 2022. Available online: [https://ec.europa.eu/echo/what/humanitarian-aid/forced-displacement-refugees-asylum-seekers-and-internally-displaced-people-idps\\_en](https://ec.europa.eu/echo/what/humanitarian-aid/forced-displacement-refugees-asylum-seekers-and-internally-displaced-people-idps_en) (accessed on 14 December 2021).
5. Araya, F.; Faust, K.; Kaminsky, J.A. Understanding hosting communities as a stakeholder in the provision of water and wastewater services to displaced persons. *Sustain. Cities Soc.* **2020**, *57*, 102114.
6. World Bank. 2022. Available online: <https://www.worldbank.org/en/topic/forced-displacement#1> (accessed on 14 December 2021).
7. Bier, V.M. Understanding and Mitigating the Impacts of Massive Relocations Due to Disasters. *Econ. Disasters Clim. Chang.* **2017**, *1*, 179–202. <https://doi.org/10.1007/s41885-017-0003-4>.
8. Leyden, K.M. Social capital and the built environment: The importance of walkable neighborhoods. *Am. J. Public Health* **2003**, *93*, 1546–1551. <https://doi.org/10.2105/ajph.93.9.1546>.
9. Jayakody, C.; Malalgoda, C.; Amaratunga, D.; Haigh, R.; Liyanage, C.; Witt, E.; Hamza, M.; Fernando, N. Approaches to Strengthen the Social Cohesion between Displaced and Host Communities. *Sustainability* **2022**, *14*, 3413. <https://doi.org/10.3390/su14063413>.
10. Witt, E.; Sharma, K.; Lill, I. Mapping construction industry roles to the disaster management cycle. *Procedia Econ. Financ.* **2014**, *18*, 103–110. [https://doi.org/10.1016/S2212-5671\(14\)00919-8](https://doi.org/10.1016/S2212-5671(14)00919-8).
11. Amaratunga, D.; Haigh, R.; Malalgoda, C.; Keraminiyage, K. Mainstreaming Disaster Resilience in the Construction Process: Professional Education for a Resilient Built Environment. A Report of the CADRE Project: Collaborative Action towards Disaster Resilience Education. 2017. Available from: <https://pure.hud.ac.uk/en/projects/collaborative-action-towards-disaster-resilience-education> (accessed on 14 December 2021).
12. Baartman, L.K.; Bastiaens, T.J.; Kirschner, P.A.; Van der Vleuten, C.P. Evaluating assessment quality in competence-based education: A qualitative comparison of two frameworks. *Educ. Res. Rev.* **2007**, *2*, 114–129. <https://doi.org/10.1016/j.edurev.2007.06.001>.
13. Amaratunga, D.; Malalgoda, C.; Haigh, R.; Jayakody, C.; Senanayake, A.; Fernando, N.; Hamza, M.; Liyanage, C.; Lill, I.; Witt, E. *A Built Environment Perspective on Post-Disaster and Conflict-Induced Displacement. A Report of the REGARD Project: Rebuilding after Displacement*; International Council for Research and Innovation in Building and Construction: Kanata, ON, Canada, 2022.
14. Rieg, D.L.; Lima, R.M.; Mesquita, D.; Scramim FC, L.; Neto, O.M. Active learning strategies to develop research competences in engineering education. *J. Appl. Res. High. Educ.* **2021**, *14*, 1210–1223. <https://doi.org/10.1108/JARHE-01-2021-0038>.
15. Boshier, L.; Chmutina, K.; Von Meding, J. Disaster risk reduction as a professional competency. A review of related training and education provision for built environment practitioners in the UK and Australia. In Proceedings of the International Conference on Building Resilience, Auckland, New Zealand, 7–9 September 2016.
16. Banfill PF, G.; Bridgwood, B. Facilities management and built environment conservation: Competences and issues. In *Healthy and Creative Facilities: Proceedings of CIB W70 Conference on Facilities Management*; In-House Publishing: Rotterdam, The Netherlands, 2008; pp. 9–16.
17. Nkado, R.; Meyer, T. Competencies of professional quantity surveyors: A South African perspective. *Constr. Manag. Econ.* **2001**, *19*, 481–491. <https://doi.org/10.1080/01446193.2001.9709624>.
18. Chamikara, P.B.S.; Perera, B.A.K.S.; Rodrigo, M.N.N. Competencies of the quantity surveyor in performing for sustainable construction. *Int. J. Constr. Manag.* **2020**, *20*, 237–251. <https://doi.org/10.1080/15623599.2018.1484848>.
19. Perera, S.; Babatunde, S.O.; Zhou, L.; Pearson, J.; Ekundayo, D. Competency mapping framework for regulating professionally oriented degree programmes in higher education. *Stud. High. Educ.* **2017**, *42*, 2316–2342. <https://doi.org/10.1080/03075079.2016.1143926>.
20. RICS. Requirements and Competencies Guide. 2022. Available online: <https://www.rics.org/globalassets/rics-website/media/qualify/pathway-guides/pathway-guides-requirements-and-competencies> (accessed on 14 December 2021).
21. RIBA. The Way Ahead. 2021. Available online: <https://www.architecture.com/knowledge-and-resources/resources-landing-page/the-way-ahead> (accessed on 14 December 2021).
22. Wiek, A.; Withycombe, L.; Redman, C.L. Key competencies in sustainability: A reference framework for academic program development. *Sustain. Sci.* **2011**, *6*, 203–218. <https://doi.org/10.1007/s11625-011-0132-6>.