DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

INTRODUCTION

The DHCD Design & Construction Guidelines and Standards are posted here to aid the designer of DHCD-funded projects to quickly develop acceptable solutions to the design challenges they face by showing the designer what *has* and has *not* worked for local housing authority (LHA) capital projects in the past. They also embed our evolving understanding about life-cycle investment and smart approaches to sustainability. The standards do not ultimately constrain the designer's choice of solutions; they are a practical benchmark of what works well. The designer who proposes an alternative design solution must explain why the proposed solution will work better than our standard and be more cost-effective and must back up that explanation with data and examples in the field. Such explanation would be considered part of the basic design fee, not an extra service, and must be provided within the normal design contract timeframe.

These standards were launched in 2007 and have just been comprehensively revised for the first time in 2014. These standards will be continually reviewed and revised as we gain more experience with existing products and techniques and as new products and techniques become available and withstand the test of time.

Your feedback on these standards (format or content) is most welcome. We would be particularly interested in designers who would like to share with us materials or design details which you have found to be extremely reliable and cost-effective over several years of use and observation. Please email all suggestions or comments to me at the address shown below. Thank you for your interest in DHCD-funded work.

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INTRODUCTION

The Design and Construction Guidelines and Standards (the Standards) are DHCD's technical recommendations regarding materials, products, and installation, relevant to the development of construction specifications. The Standards summarize what works and what does not in order to promote high quality, sustainable construction that reduces initial costs without compromising long-term economies.

USING THESE STANDARDS

These Standards provide useful information when making detailed, technical decisions about material, design, and installation. Architects and engineers are the primary audience, although housing authorities will likely use them as a reference for smaller jobs that may not require engagement of design professionals. The information presented contains technical language that may be unfamiliar to those who are new to construction.

This is not an outline specification, but rather a reference source for Designers in the preparation of construction documents. Most of the standards are stated in the form of recommendations. Recognizing that each project has a unique context, alternative solutions to illustrate how a high level of construction quality can be achieved in different contexts and circumstances may be shown. DHCD expects the construction of state-aided housing to meet the level of quality described in these Standards. When no specific information is provided, standards of professional practice apply.

CODES

Architects and Engineers are responsible for identifying and addressing all relevant codes and regulations pertaining to the design and construction of buildings. The Standards do not identify or interpret code requirements; in some cases they do recommend materials and features that are more stringent than what is required in applicable codes. The Standards are not intended to contradict state codes and regulations. If recommendations in the Standards are in conflict with codes or regulations applicable to a particular project, the Designer should bring it to the attention of the DHCD design review architect. However, the Designer is still responsible for producing a design that complies with all codes, regulations, laws, ordinances, and by-laws.

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Filed Sub Bid

M.G.L. c.149 §44F

FILED SUB TRADES

When using the Standards the following symbol may appear in a section required by a construction contract. M.G.L. c.149 §44F requires Awarding Authorities to make certain trades Filed Sub Trades. These trades are identified by the symbol shown on the left. Technical specifications for Filed Sub Trades require more administrative attention than the no- filed sub trades. For example the specifications must spell out exactly which drawings contain work to be completed by this trade and the work in related sections needs to be spelled out clearly to avoid conflict which usually revolves around a sub bidder claiming work is not required under its section. If there are any questions regarding the requirements of c.149 §44F contact your DHCD Project Manager.

ADA/MAAB

REQUIREMENTS

ADA - AAB REQUIREMENTS

Those items that may be seriously impacted by the Americans with Disabilities Act (ADA) or the Massachusetts Architectural Access Board (MAAB) are indicated by the symbol shown at the left.

HOW THE STANDARDS ARE ORGANIZED

These Standards consist of sections that are organized as closely as possible to the Construction Specifications Institute (CSI) index. Each section includes the title of the section, the general CSI division to which the section belongs, and the topic areas included within the section. For example, section 07 40 00 Siding is part of CSI's Division 7, Thermal and Moisture Protection and covers within it Vinyl and Polypropylene Siding, Wood Clapboards, Fiber Cement Siding as well as other sidings used on housing Requirements and recommendations for each of these topic areas is described in terms of materials, design, and execution.

DHCD requires that specification numbers follow the CSI numbers as closely as possible. The actual numbering may differ as long as the specification sections are clearly identifiable.
The Standards include some drawings which describe DHCD's recommendations for the detailing and assembly of building components. The drawings are for illustrative purposes only, and should not be taken as standardized details.

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SUSTAINABILITY AND LIFE-CYCLE DESIGN CONSIDERATIONS

In Massachusetts, Executive Order 484 requires public agencies to "Lead by Example" in promoting energy and water conservation and clean energy practices, waste reduction and recycling, environmentally preferable procurement, toxics use reduction, and resource conservation. These values are also captured in the Governor's Sustainable Development Principles and the Green Communities Act of 2008, as amended.

Since 2007, DHCD's Bureau of Housing Development & Construction has had a Sustainability Program, which has focused on seeking technical and financial resources for housing authorities interested in saving energy and water, improving indoor air quality, pilot testing "green" building products and advancing renewable energy. Many of DHCD's staff engineers and architects also have LEED accreditation and all design staff have regular opportunities for attending in-house presentations and outside conferences about energy and sustainability best practices. Many of the lessons learned have informed the 2014 revisions to these Standards.

In recent years, experts in the green building community have advanced Leadership in Energy & Environmental Design (LEED) certifications for existing buildings and new construction, Energy Star Product and Design Certifications, Passive House standards and Life Cycle Assessment (LCA) approaches and tools. In soliciting design work for particular projects, DHCD may require designers to work with utility energy efficiency programs on Energy Star certification or design a project to be LEED-certifiable. However, these Guidelines & Standards do not explicitly require application of these certifications and standards across the board.

Throughout these guidelines, "Eco-Icons" are located adjacent to text to highlight how sustainability objectives might be applicable to design and construction approaches public housing capital improvement:

- **Energy Performance and Intensity**: Saving energy in public housing decreases operating costs, as well as reduces air pollution, greenhouse gas emissions, and natural resource depletion. The embedded energy intensity of building products (energy use in manufacture, distribution to market, installation and use) should be balanced with other attributes such as durability, easy maintenance or recyclability at end of life. DHCD is supportive of

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demonstrating renewable energy technologies such as solar photovoltaic and thermal, combined heat and power, air source heat pumps and biomass heating, which reduce consumption of fossil fuel and greenhouse gas emissions and help advance Massachusetts' clean energy economy.

- **Recycling/ Green Products**: Recycled content, non-toxicity, recyclability and packaging waste are relevant to specification of products. Sound recycling practice in construction is also a high priority in Massachusetts given limited landfill capacity.
- **Water Conservation**: Saving water reduces operating costs, extends life of septic systems, and is consistent with resource conservation goals.
- **Health/ Indoor Environmental Quality**: Health impacts on residents, housing authority staff and construction workforce can be affected by design decisions, construction period impacts and operational practices. Indoor environmental quality in public housing can be affected by construction best practices relative to:
    - Mold, dust and moisture management
    - Off-gassing or other exposure to chemical contaminants, including but not limited to VOCs (volatile organic carbon compounds)
    - Pest-related contamination & pest management methods.

A matrix of how these issues are relevant to various sections is attached.

DHCD technical and sustainability staff welcome suggestions from designers on innovative approaches that accomplish these sustainability objectives. While the focus must always be on the existing budget constraints, DHCD and housing authorities may be receptive to sustainability initiatives that require augmenting budgets with utility rebates, targeted grants, power purchase agreements or tax credits.

SUSTAINABILITY ISSUES MATRIX				
Energy Issues -- Energy Use, Conservation Features or Embedded Energy in Products; Reduced Transport Energy for Local Sourcing; renewable energy				
Recycling/Recyclability - Recycled Content and Post-Use Recycling Opportunities				
Water - Conserve a limited resource; reduce wastewater				
Health - Limit exposure of humans (Residents, Maintenance and Construction Workers) to toxic materials, pests and allergens; ensure indoor air quality; protect groundwater and soil				
CATEGORIES				
	ENERGY	**RECYCLING**	**WATER**	**HEALTH**
01 74 19 -- Waste Management	X	X		
02 41 00 -- Demolition		X		X
02 61 00 -- Contaminated Site Material Removal		X		X
02 65 50 -- Underground Storage Tank Removal				X
02 82 00 -- Asbestos Remediation				X
02 83 00 -- Lead Paint Remediation				X
03 30 00 -- Concrete	X	X		
04 20 00 -- Unit Masonry	X			
05 10 00 -- Structural Steel	X	X		
05 55 00 -- Miscellaneous and Ornamental Iron		X		
06 10 00 -- Rough Carpentry	X	X		X
06 20 00 -- Finish Carpentry	X			
06 50 00 -- Structural Plastics & Composites		X		
06 64 00 -- Plastic Tub & Shower Panels		X		
06 65 00 -- Plastic & Composite Trim		X		
07 07 00 --Solar Photovolatic Systems	X			
07 10 00 -- Waterproofing and Dampproofing				
07 20 00 -- Building Insulation & Moisture Protection	X			X
07 20 001 --Attic Hatch & Insulation Tent	X			
07 20 002 -- Soffit Insulation Dam	X			
07 30 00 -- Asphalt Roof Shingles	X	X		
07 40 00 -- Siding	X	X		
07 45 00 -- Gutters and Downspouts	X			
07 50 00 -- Membrane Roofing	X			
07 62 00 -- Sheet Metal Trim & Flashing				

07 90 00 -- Sealants	X			
08 10 00 -- Doors and Frames	X			
08 40 00 -- Entrances and Storefronts	X			
08 50 00 -- Windows	X			
08 70 00 -- Hardware	X			
09 20 00 -- Gypsum		X		X
09 30 00 -- Tile				X
09 64 00 -- Wood Flooring	X	X		X
09 65 00 -- Resilient Flooring		X		
09 68 00 -- Carpeting	X	X		X
09 90 00 -- Painting		X		X
10 00 00 -- Specialties	X			
11 31 00 -- Residential Appliances	X			
12 30 00 -- Casework	X			
14 20 00 -- Elevators				
21 00 00 -- Fire Suppression --Sprinklers				
22 00 00 -- Plumbing	X		X	
23 00 00 -- Heating, Ventilating & Air Conditioning	X			
26 00 00 -- Electrical	X			
28 00 00 -- Electronic Safety & Security				
31 00 00 -- Earthwork				X
31 31 00 -- Soil Treatment				X
32 12 00 -- Asphalt Paving			X	
32 30 00 -- Site Improvements	X	X	X	
32 80 00 -- Site Irrigation			X	
32 90 00 -- Landscaping	X		X	
33 00 00 -- Site Utilities				
33 36 00 -- Septic Systems			X	X

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