DEPARTMENT OF GENERAL SERVICES
BUREAU OF CAPITAL OUTLAY MANAGEMENT
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BCOM Newsletter

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Organizational Changes

Ed Gully, the Director of the Division of Engineering and Buildings for the past four years, resigned effective June 24, 2016 to take a position with the U.S. Department of Energy. DGS Director, Chris Beschler, noted "Ed's steadfast leadership, attention to detail and dedication to his team have served the department well over the past four years … We appreciate Ed's efforts and celebrate his accomplishments leading DEB."

Bureau of Capital Outlay Management Director **Mike Coppa** will fill the position in the interim as DGS searches for a permanent replacement. ❑

VCCO Certifications

Congratulations to the following individuals who recently passed the VCCO Certification Exam:

- **Mike Biscotte, Radford University**
- **Annmarie Irwin, George Mason University**
- **Terry Steen, Bureau of Capital Outlay Management**
- **Stephanie White, Department of Military Affairs**

Virginia Construction Contracting Officers are state and local government employees who have completed the necessary training and successfully passed a multi-part examination focused on state procurement law, policy and procedures. VCCOs perform several keys functions in delivering projects including the procurement of professional services; the receipt, opening and review of bids; and in some cases the approval of CO-8 forms for recommending the award of construction contracts.

For more information on CPSM and VCCO seminars, visit the Seminars page on the Bureau of Capital Outlay Management's website. ❑

The Energy Conservation Code and Building Thermal Envelopes

Of the many building components that affect the operational energy costs of a building, such as lighting and HVAC equipment, the building thermal envelope has perhaps the most lasting impact. As more efficient lighting systems and HVAC equipment are made available these systems can be replaced during the life of a building; however the building's thermal envelope, once constructed, is rarely improved. The building envelope not only affects the size of heating and air conditioning equipment it significantly affects the costs to operate a building well into the future. Considering that the Commonwealth of Virginia's design philosophy is to design buildings with a 50+ year lifespan, an effective building thermal envelope is critical to managing energy costs.

The 2012 Virginia Construction Code Section 1301.1.1 requires that each building must be designed and constructed in accordance with the 2012 Virginia Energy Conservation Code (VECC). This means that all buildings must comply with VECC thermal envelope requirements except in the unique case of "low energy buildings". In accordance with the preface of the VECC, low energy buildings are defined as buildings with a peak design rate of energy usage less than 3.4 Btu/h*ft^2 or those that do not contain conditioned space. In these "low energy buildings" the VECC thermal envelope requirements do not apply. Note, however, that all other requirements of the VECC do apply. The preface also allows this exemption to apply to the "low energy" portions of buildings that contain both conditioned and "low energy" spaces, such as an office building with an attached unconditioned garage, so long as the "low energy" portion (the garage) is separated from the conditioned portion (the office) by building thermal envelope assemblies complying with the VECC.

The question then becomes, "How does a building comply with the VECC thermal envelope requirements?" Unfortunately, this question is not as simple to answer as it would appear. The VECC provides multiple paths to compliance and the paths are not the same for new buildings as they are for renovations and additions. In addition to this, the energy code affects multiple aspects of the building that are often designed by different individuals. While multiple paths are available, the building must be designed to comply with a single compliance path. The design team must communicate and coordinate with each other to design the building along the same compliance path. Likewise, it is critical that the design team inform the BCOM reviewer of the intended compliance path. That is why the Construction and Professional Services Manual, 2016 Edition, Revision 0, published on April 20, 2016 (CPSM) requires that the intended compliance path be detailed on the title or code compliance sheet of each drawing submittal and in any design narrative.

As for the available compliance paths, there are three possible paths for new buildings (VECC C401.2):

> **Path 1** is to comply with ANSI/ASHRAE/IESNA 90.1-2010 (ASHRAE 90.1). For this path, the energy code defers to ASHRAE 90.1. It is important to note that the administration and general requirements sections as defined by VECC Chapters 1 & 3 are still applicable as well as the

requirements of ASHRAE 90.1. Also ASHRAE 90.1 itself has multiple compliance paths to achieve a compliant building. While it is not the intent of this article to go into detail for ASHRAE 90.1 compliance, it is important that the design team fully details the intended path to compliance for the reviewer.

Path 2 is a prescriptive path defined by VECC Sections C402, C403, C404, and C405. Path 2 also requires the designer to choose one of three additional efficiency package options that the building is to be designed to; C406.2 – enhanced HVAC equipment efficiencies, C406.3 – reduced lighting power densities, or C406.3 – on-site renewable energy. This path is simpler in that the VECC describes how each portion of the building is to comply.

Path 3 is a performance path defined by VECC Section C407 and mandatory compliance with sections C402.4, C403.2, C404, C405.2, C405.3, C405.4, C405.6, and C405.7. For compliance the proposed building must have a building energy cost ≤ 85% of the reference building. This path is more complex, and while it offers the designers some flexibility, the supporting documentation (VECC C407.4) must be detailed and the calculations (VECC C407.5) can take some time to perform and review.

For additions, alterations and repairs to existing buildings (VECC C401.2.1) there are only two paths:

Path 1 is a prescriptive path defined by VECC Sections C402, C403, C404, and C405. This path is similar to Path 2 for new buildings; however an additional efficiency package is not required.

Path 2 defers to ASHRAE 90.1 for compliance.

When using the prescriptive compliance path the VECC again offers the designers a choice when designing the thermal envelope. Building opaque thermal envelope assemblies must either comply with the prescriptive minimum insulation requirements of Table C402.2 or the designer may provide an alternative assembly that provides a U-factor, C-factor, or F-factor less than that indicated in Table C402.1.2. Each assembly must comply with either table C402.2 or table C402.1.2. For example a building roof with insulation entirely above deck may be insulated with R-25 continuous insulation (Table C402.2 climate zone 4), while the metal frame walls may be insulated with a combination of R-19 batt insulation and R-5 continuous insulation achieving a U-factor of 0.063 (compliant with Table C402.1.2, U-factor ≤ 0.064).

Wall Assembly U-Factor Calculation	
Component	R-Value
Interior Air Film [1]	0.68
5/8" GWB [1]	0.56
R-19 in 6" Steel Stud – 16" O.C. [2]	7.10
5/8" Plywood Sheathing [1]	0.77
R-5 Continuous Insulation [1]	5.00
1/2" Air Gap [1]	0.90
4" Face Brick [1]	0.60
Exterior Air film (15 mph wind) [1]	0.17
Total R-Value	15.78
U-Factor = 1/R-Value	0.063
[1] Source: ASHRAE Fundamentals Handbook – 2005.	
[2] Source: ASHRAE 90.1-2010 Table A9.2B	

Where using an alternative assembly (Table C402.1.2) the designer must provide the appropriate U-factor, C-factor, or F-factor calculation to support the chosen assembly. The calculation must account for thermal bridging where applicable. In the example wall assembly above, the R-19 insulation is installed in a 6" steel stud wall cavity; the steel studs thermally bridge the insulation reducing its effectiveness and yielding an equivalent R-value of 7.10 instead of the insulation's specified R-19. ASHRAE 90.1-2010 appendix A can be a helpful resource in determining the equivalent R-value of insulation installed within framing.

Sloped roof insulation is another element that the designer must pay careful attention to. The VECC only permits the designer to account for the first inch of sloped insulation from the minimum thickness when calculating an area-weighted U-factor equivalent. Take our example above, where R-25 continuous insulation is required above the roof deck. The deck is level, so the roof insulation must be tapered at 1/4" per foot to provide adequate drainage. In our example, let's assume we have a single slope roof (to a gutter system) with polyisocyanurate roof insulation at R-5.7 per inch thickness. The roof is 26 feet wide and the insulation thickness tapers from 3.5" (R-19.95) to 10" (R-57). It is important to note that the VECC is prescribing minimum performance and, as such, does **NOT** allow the designer to simply average these numbers (R-38.48) for compliance as there would be spaces with too little insulation. Instead the code only allows the designer to account for the first inch of slope, from 3.5" to 4.5" then the remainder of the roof area (where insulation thickness is > 4.5") must be calculated at 4.5" thickness. In this example the roof insulation slopes from 3.5" (R-19.95) to 4.5" (R-25.65) in the first 4 feet (average R-22.8). The remaining 22 feet is thicker than 4.5" and may only be calculated at 4.5" thickness (R-25.65). The area-weighted average is then calculated at (4'*R-22.8 + 22'*R-25.65)/26' = R-25.21. Again, when using the area-weighted U-factor equivalent to achieve compliance the designer must provide the reviewer with the supporting calculations.

The 2012 VECC now requires a continuous air barrier throughout the building envelope (Section C402.4.1). While the barrier may be located on the inside or outside of the building envelope, the designer must detail how the air barrier transitions from one assembly to another. As in our example above the roof membrane and the plywood sheathing (joints must be sealed) may both act as part of the continuous air barrier. The designer would need to detail how the air barrier transitions from the plywood sheathing to the roof membrane. The slab on grade may also serve as part of the continuous air barrier, but again, the transition from the plywood sheathing to the concrete floor must be detailed.

It is important to note that the VECC prescriptive path has limitations, such as the aggregate area of vertical fenestration may not exceed 30% of the gross above grade wall area (40% in limited conditions) and the aggregate area of skylights may not exceed 5% of the roof area. Where a building exceeds these limitations, the design team must use either the performance path or ASHRAE 90.1 for compliance. ❑

Art & Architectural Review Board

CPSM Section 4.4.1

The Art and Architectural Review Board (AARB) consists of five[1] members appointed by the Governor. It was established to "encourage the design of buildings and works of art which are both aesthetically and functionally appropriate to the agency for which they are intended". All new buildings, additions to existing buildings and any other new elements on state property, regardless of the funding source, must be reviewed and approved by the AARB. Presentation(s) of the design shall be made to the AARB for comment and recommendation for approval after the project design has been submitted to BCOM for review and comment at the schematic and/or preliminary submittals. The initial AARB presentation should be scheduled as soon as the exterior appearance of the building is no longer likely to change. The location of the building onsite, overall massing, materials selection, colors and landscaping should be defined prior to making a presentation. See [AARB Guidelines for Submittals and Presentations] for more information.

1 - The Director of the Department of Historic Resources (DHR) or her designee, also serves as an ex officio member.

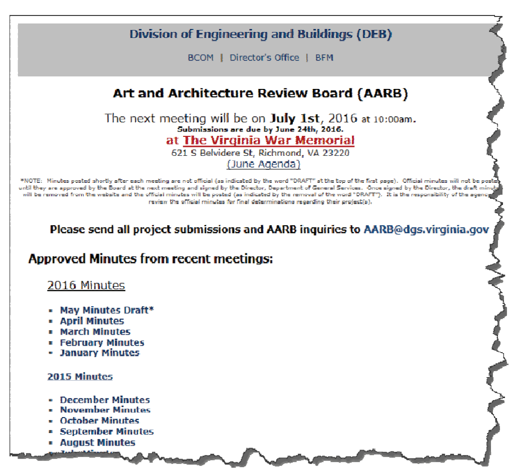
Code of Virginia

The establishment of the Art and Architectural Review Board, its authority, composition, and other related information are described in Code of Virginia §2.2-2400.

AARB Webpage

The AARB webpage, hosted on the DGS/DEB website, contains the following resources:

- AARB Meeting Announcements
- The AARB Email Address: AARB@dgs.virginia.gov
- Approved Minutes from recent meetings.
- The Project Data Sheet template.
- AARB Guidelines for Submissions and Presentations.



Division of Engineering and Buildings (DEB)

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Art and Architecture Review Board (AARB)

The next meeting will be on **July 1st**, 2016 at 10:00am.
Submissions are due by June 24th, 2016.
at The Virginia War Memorial
621 S Belvidere St, Richmond, VA 23220
(June Agenda)

*NOTE: Minutes posted shortly after each meeting are not official (as indicated by the word "DRAFT" at the top of the first page). Official minutes will not be poste until they are approved by the Board at the next meeting and signed by the Director, Department of General Services. Once signed by the Director, the draft minut will be removed from the website and the official minutes will be posted (as indicated by the removal of the word "DRAFT"). It is the responsibility of the agency review the official minutes for final determinations regarding their project(s).

Please send all project submissions and AARB inquiries to AARB@dgs.virginia.gov

Approved Minutes from recent meetings:

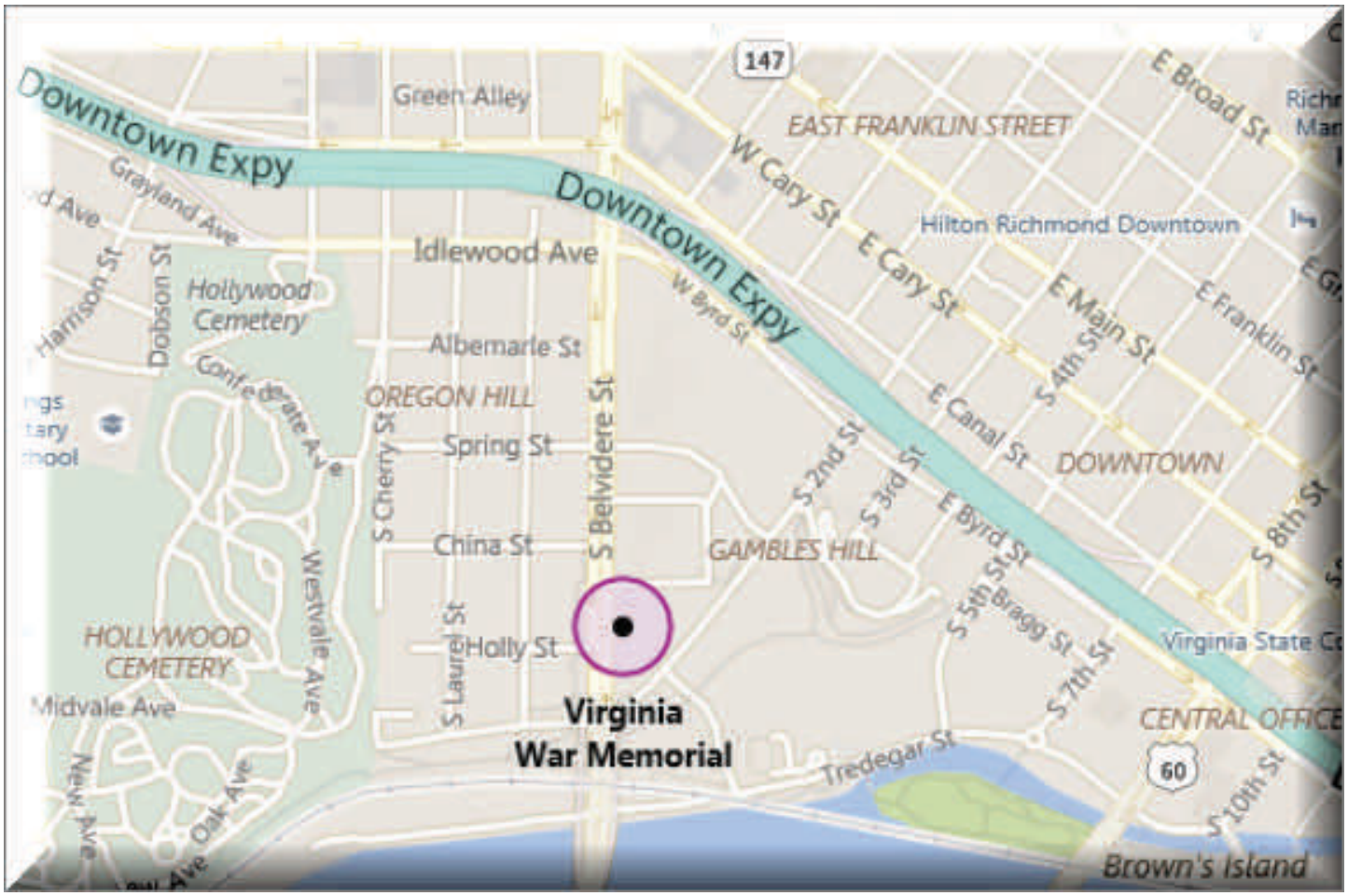
2016 Minutes

- May Minutes Draft*
- April Minutes
- March Minutes
- February Minutes
- January Minutes

2015 Minutes

- December Minutes
- November Minutes
- October Minutes
- September Minutes
- August Minutes

AARB Meeting Location



The AARB meets monthly on the first Friday, unless otherwise noted. The meeting minutes, agenda, and meeting schedule are available on DEB's AARB webpage. The meetings are usually held at the Virginia War Memorial (621 S Belvidere St., Richmond, VA 23220) but please refer to the AARB webpage for location changes and other meeting information. ❑

CPSM Forms Update

The following CPSM forms were recently revised and are available for download:

- **DGS-30-198 CR-2, Cost Review Questionnaire** (Revised 06-16)
- **DGS-30-199 CR-3, Project Planner** (Revised 06-16)
- **DGS-30-224 Building Cost Summary** (Revised 06-16)

Please download Form **DGS-30-000, Capital Outlay Forms Master List** for a complete listing of the latest version of each CPSM form. All current forms may be downloaded from the DGS Forms Center. If a prior version of a form is required, please contact capout@dgs.virginia.gov. ❑