Appendix B: Recommendation Matrix

The ISRB believes that all recommendations in this report must be implemented by HCDFRS, but recognizes that some recommendations are of a higher criticality. As such, the recommendations have been assigned a priority ranking to denote the time period in which the recommendation should be implemented. The priorities are as follows:

- Priority 1: Implementation within 0-6 months
- Priority 2: Implementation within 7-12 months
- Priority 3: Implementation within 12-24 months

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
Incident Command				
A.1 The current HCDFRS policy permitting the first arriving unit officer may forgo establishing command when, "A chief, command officer, or other company officer is arriving nearly simultaneously and takes Command" is flawed. The first arriving unit must assume command regardless of circumstance, so that there is always clear command and control of the scene. The formal announcement of command does not add anything to the exercise of the command.	A.1.1 HCDFRS General Order 300.07 and General Order 310.01 should be amended to clearly establish the first arriving unit officer as the Incident Commander, eliminating the circumstances when Command may be passed. Instead, the unit officer as Incident Commander may transition to a Command level staff once the Command officer reaches the incident scene.	Operations Command	**1**	
A.2 Declaring an offensive or defensive strategy during the initial radio report is insufficient since it does not allow the Incident Commander to gain a firm sense of the incident before declaring a strategy.	A.2.1 The Initial Radio Report protocol should be amended, removing the requirement that the Incident Commander declare an offensive or defensive strategy.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
A.3 The Incident Commander did not have a strong mental model of the incident, likely because of current HCDFRS practice of Incident Commanders relying on aides to complete a 360-degree assessment of the incident instead of conducting it themselves.	A.3.1 The Incident Commander should complete their own 360-degree assessment of the incident to establish their mental model.	Operations Command	**1**	
A.4 The Incident Commander maintained a calm demeanor during the MAYDAY.				
Strategy and Tactics				
B.1 HCDFRS does not have a clear philosophy of command, which limits an Incident Commander's effectiveness in executing strategies and tactics.	B.1.1. HCDFRS must clarify its philosophy of Incident Command, with a recommendation for adopting a mission-based expression of strategy where lower level officers (unit officers) are empowered to make tactical decisions to carry out the overall incident strategy. This philosophy of Command should	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	then be reflected in all General Orders and supported by training. B.1.2. General Order 310.01:Single Family Townhome and Structure Fire Operational Guidelines must be revised to more clearly articulate strategy employed on the fireground, modernizing the current binary "offensive"/"defensive" strategy to more dynamic strategy declarations.			
B.2 Group supervisors and unit officers failed to give proper direction and orders on the fireground.	See Recommendations B.1.1 and B.1.2.	Operations Command	**1**	
B.3 The Incident Commander established a strategy for the incident according to HCDFRS policy, but that strategy was announced before the Incident Commander established a clear mental model of the incident.	B.3.1. The Incident Commander should complete a 360-degree survey and situational assessment of the fireground before declaring a strategy.	Operations Command	**1**	
B.4 Strategies and tactics deployed during this incident were hindered	B.4.1. HCDFRS must implement hands-on, competency-based training	Operations Command;	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
by a lack of cohesiveness among the crews.	in realistic conditions that reinforces fundamental skills and teamwork necessary for success on the fireground.	Support Services		
B.5 Based on the situational cues crews should have known that the fire was in the basement.	See Recommendation B.4.1.	Operations Command; Support Services	**1**	
B.6 Tactical decision making by crews on the fireground was compromised by their frustration to locate the fire.	See Recommendation B.4.1.	Operations Command; Support Services	**1**	
B.7 Crews failed to report critical information to the Incident Commander and other crews on the fireground, hindering overall strategy and tactics used during the incident.	B.7.1. HCDFRS leadership must hold crews accountable for failing to execute actions dictated by the General Order without informing the Incident Commander. B.7.2. HCDFRS must integrate reporting of location into existing CAN reports (LCAN).	Operations Command	**1**	
B.8 Engine 101 made entry into the first level into the Hazard Zone without express authorization from Command	See Recommendations B.7.1 and B.7.2.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
B.9 This incident was dispatched as a Metro Box, although 7005 Woodscape Drive is along a street without fire hydrants.	B.9.1. HCDFRS must modify this policy of what qualifies as a metro box or rural box based on clear distance from a water source to the incident site.	Operations Command	**1**	
B.10 During and after the MAYDAY emergency, crews not involved in the RIC efforts did not continue activities to locate, confine, and extinguish the fire.	B.10.1. HCDFRS personnel must be trained to: • Complete a rescue attempt from an upper level floor. • Continue suppression efforts while RIC operations are underway. B.10.2. Incident Commanders must be trained on managing RIC operations. B.10.3. Crews should continue to use restraint in ventilating structures.	Operations Command; Support Services	**1**	
Communications				
Communications—Fireground Related				
C.5 Fireground Communications were ineffective at relaying critical information among fire crews and to Command.	C.5.1 All crew members would greatly benefit from additional training on appropriate and effective fireground communications. This includes: o (C.5.1) Effectively communicating reports to	Operations Command & Support Services	**1**	
C.6 Responding crews failed to follow protocol in communicating which units are responding and with what				

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
staffing level is included in the response. C.7 Responding crews failed to verify that all crewmembers were operating on the same Talk Group before engaging the fire and a critical communication was transmitted over Bravo 2, an unmonitored channel. C.8 Responding crews left communication loops open, failing to use the Order Method. This led to responding crews interrupting and cross-talking on the operational radio channel.	crew leaders and group/division supervisors by providing clear and concise status reports. ○ (C.5.2) HCDFRS should incorporate standard naming convention for structure floors and train all personnel to use common terminology on the fireground. ○ (C.6.1) Properly announcing responding apparatus with staffing level as ordered in General Order 410.01 Communications. ○ (C.7.1) Tactical radio communications when entering and exiting an incident hot zone. ○ (C.7.2) Crew selecting and verifying the appropriate tactical channel for fireground operations. ○ (C.7.3) HCDFRS should train all personnel to follow closed-loop communication best			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	practices during fireground operations. For example, implementing the recommended complete loop communication recommended by FEMA in 1999. This process has been effectively executed among other fire departments to enhance crew and command understanding during active incidents. ○ (C.8.1) HCDFRS should develop protocols for verifying that all personnel responding to and operating on an incident scene have their mobile and portable radios selected to the correct tactical radio channel. This could be actualized by requiring crew officers to announce when their crew is entering a hot zone which will ensure that the officer			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	is on the correct tactical radio channel, accounts for the crew's entry time, and provides accountability of the unit for the Incident Commander.			
Communications— Equipment Related				
C.9 The transmission of FF Flynn's MAYDAY and emergency identifier on Bravo 2 likely had no impact on the survivability of FF Flynn as the RIC had already been deployed and was rapidly gaining access to FF Flynn at the time of the activation. C.10 The Motorola APX8000XE portable radio assigned and worn by FF Flynn functioned as designed and programmed. C.11 Activation of an emergency button (via manual depression or man-down feature) sounds on the radio channel the radio is set to operate on.	C.9.1 Current configuration of the radio broadcasts the emergency identifier on the radio channel on which the radio is currently operating. To mitigate human error of a crew member operating on a channel that is unmonitored, an emergency identifier activation on the Bravo, Charlie, and Delta Talk Groups should revert the member to a channel that is always monitored by the Communications Center and the Incident Commander.	Fire Chief	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
C.12 The Motorola APX8000XE radio is a complex piece of life safety equipment, requiring specific training to operate appropriately. As detailed in the Training Section of this report, the department training for operation of this radio system prior to its wide deployment in the field was inadequate to ensure that all crew members could effectively operate the new equipment. A major shortcoming of the training was that it provided only an emailed slideshow of how to operate the radio and did not provide any "hands-on" practice to ensure that personnel could effectively operate the radio.	C.12.1 Because of the complexities of operating the Motorola APX8000XE radio, more extensive training prior to its deployment in the field should have been established to ensure that crews can operate the radio appropriately. A thorough training program, as detailed in Section III.J, that includes a didactic portion, practical evolutions, and a competency-based evaluation is appropriate for a piece of equipment so vital to hazard zone operations as the portable radio.	Operations Command and Support Services	**1**	
C.13 The Motorola APX8000XE radio programming was suboptimal for features such as the Emergency Identifier.	C.13.1 HCDFRS should convene a work group to evaluate all programming and accessory options in the Motorola	Operations Command and Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	APX8000XE radio to optimize the safety, efficiency, and technology of the equipment.			
MAYDAY				
D.1 FF Flynn transmitted a MAYDAY call, but it was unheard by the fireground personnel and Communications Center because it was on the unmonitored Bravo 2 talk group.	D.1.1 Prior to entering an IDLH environment, firefighters must verify that they are operating on the appropriate talk group. D.1.2 HCDFRS must reprogram its radios to have the emergency identifier button revert the firefighter experiencing a MAYDAY to the monitored talk group (e.g. Bravo 1). This should prompt the Communications Center to monitor all transmissions in the monitored talk group. D.1.3 HCDFRS must require Incident Commanders to confirm the operational channel with the individual calling the MAYDAY. The Incident Commander shall advise the individual to visually check their portable radio, if possible. Additionally, the Communications Center or	Operations Command & Support Services	2	Radios Reprogrammed 15 FEB 2019

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	Incident Commander on Bravo 7 should instruct a firefighter experiencing a MAYDAY emergency to press their emergency identifier.			
D.2 Engine 101A's MAYDAY transmission was partially unintelligible, with the Incident Commander unable to ascertain who, what, where portions of the transmission.	D.2.1 Personnel must have consistent training on how to clearly make a MAYDAY transmission for themselves or others. This training should be done while the individual is in a high-stress environment and tasked with this responsibility.	Operations Command & Support Services	2	
D.3 The Incident Commander attempted to ascertain the necessary MAYDAY details, but due to a number of factors was not able to identify FF Flynn's distress and location until 02:24:05, at least four (4) minutes after FF Flynn fell through the floor.	D.3.1 Incident Commanders and officers must train on ways to clarify unclear MAYDAY transmissions, providing reassurance to individuals as appropriate. This training should also include processes for the Incident Commander to work with the Communications Center. This process includes having the Communication Center send emergency tones and announcing that a MAYDAY has been declared. The Incident Commander shall notify all personnel operating on the	perations Command & Support Services	2	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	incident Who is calling the MAYDAY, What the problem is, and Where the emergency is located.			
D.4 A verbal evacuation was ordered by the Incident Commander, but no evacuation tone was utilized in the Woodscape Drive Incident.	D.4.1 HCDFRS must use separate tones for an emergency tone and an evacuation tone. These separate tones shall be easily differentiable, with personnel able to easily identify the tone and understand what is required of them when the tones are activated.	Operations Command & Support Services	2	
D.5 There is evidence that FF Flynn attempted to self-extricate while awaiting RIC support.	D.5.1 HCDFRS must conduct training on MAYDAY emergencies on a regular basis. This training should include a review HCDFRS General Order 300.04 MAYDAY Situations and practical evaluations. Practical evaluations shall give personnel the opportunity to transmit and receive a MAYDAY emergency while operating under simulated emergency conditions.	Operations Command & Support Services	**1**	
Structure Evacuation				
E.1. The Incident Commander's evacuation order at 02:42:34 was	E.1.1 HCDFRS must revise General Orders to include a process for	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
an "exit" under General Order 410.01 Communications.	reentering a structure following an evacuation order. Currently the General Orders do not address the resumption of interior operations following an emergency evacuation order. Once an emergency evacuation has occurred, the incident commander should conduct size-up of the structure and evaluate fire conditions to determine an appropriate mode of operation. The proposed language should include a continuous reevaluation process of the incident. E.1.2 HCDFRS must revise General Orders to separate evacuation from strategy changes for clarity.			
E.2. The change of strategy from offensive to defensive strategy also represented an exit, or evacuation of the dwelling.	See Recommendations E.1.1 & 1.2	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
E.3. There are conflicts between General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines and General Order 410.01 Communications concerning the evacuation process.	E.3.1 HCDFRS must examine the processes outlined in General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines and General Order 410.01 Communications to determine if either process meets current operational needs, make any needed modifications and then codify both process into one single process and rewrite each General Order with the same modified process. Additionally, the orders must be revised to: o Align with the intent of NFPA 1561's language: "[A]t the conclusion of the MAYDAY or emergency traffic situation, the Incident Commander should then transmit all clear, resume radio traffic."	Operations Command; Support Services & Howard County Police Department	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	○ Add the sounding of apparatus (air horns minimally) at the ordering of an abandon evacuation order. ○ Include PARs of all crews at an incident who are not in staging. E.3.2 HCDFRS personnel should be trained on all modified orders. The training should include a practical component that utilizes the audio warning(s) fire fighter will hear via Communications Center. This training should also include units from outside jurisdictions that regularly respond into Howard County. E.3.3 HCDFRS must standardize emergency evacuation procedures, practices and alerts with surrounding jurisdictions so that neighboring jurisdictions and HCDFRS have similar emergency evacuation and			

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	MAYDAY practices and audio warnings (air horns).			
E.4. HCDFRS has discontinued the practice of sounding air horns at the order of an "exit" or "abandon" evacuation due to the proliferation of portable radios.	See Recommendation E.3.1	Operations Command; Support Services, & Howard County Police Department	**2**	
Rapid Intervention Crew and Rescue Operations				
F.1. Crews near the collapsed area where FF Flynn fell should have considered a method to apply water to the area	F.1.1 Train crews who may be operating near a MAYDAY to respond to the MAYDAY situation while continuing to address suppression activities. F.1.2 HCDFRS must develop a progressive training plan that develops and reinforces basic skills. This training plan must include: • RIC training at least bi-annually, focusing on low frequency, high stress situations for operations and communication staffing. • Instruction for personnel on actions to be taken from	Operations Command & Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	different positions within the structure. For example, personnel shall be instructed on proper search techniques when searching for a downed firefighter, rescue from the floor above, stabilizing conditions, and providing protection to the MAYDAY firefighter. F.1.3 Officer training on managing a MAYDAY emergency. This training can take place simultaneously with the RIC training previously discussed.			
F.2. Crews should have used their Thermal Imaging Cameras (TIC) to locate FF Flynn and identify associated conditions in the crawlspace.	F.2.1 Crews should receive training on TIC usage and TIC limitations, and they should regularly use the TIC on various types of incidents to gain familiarity with the devices.	Operations Command & Support Services	**2**	
F.3. Crews near the space in which a MAYDAY firefighter has fallen should attempt a rescue from above	See Recommendation F.1.1	Operations Command & Support Services	**2**	
F.4. The IRIC did not function as a team, with the two members in separate physical locations completing separate tasks.	F.4.1 The Incident Commander should ensure that IRIC remains ready for deployment as a team of two. The IRIC shall be positioned at the	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	initial point of entry for rapid deployment. F.4.2 Train IRIC personnel to remain a team of two. Personnel must understand the difference between functioning as a back-up crew and IRIC.			
F.5. Engine 111's failure to assume RIC as dictated in General Order 310.01 did not impact RIC operations during the incident because the Incident Commander assigned RIC duties to Truck 7 prior to the MAYDAY.	F.5.1 Notwithstanding the lack of impact, HCDFRS must revise General Orders to instruct the Communications Center to advise the third arriving engine that they are the RIC. F.5.2 The highest-ranking responding officer, typically the responding Battalion Chief, should confirm with the third engine company that they will be the RIC engine. The RIC engine should acknowledge the assignment shortly after units transmit they are responding. F.5.3 Shift directives that may alter assignments must be communicated to the Incident Commander.	Operations Command	**1**	
F.6. Truck 7 lacked enough time because of their delayed assignment to RIC and the subsequent immediate MAYDAY	F.6.1 HCDFRS must add an additional engine company to all Box Alarms, including Local Box assignments, with the third due engine	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
to gather all standard RIC equipment and do a 360-degree assessment of the dwelling.	(minimum 4 personnel) dedicated as the RIC.			
F.7. The RIC at Woodscape Drive consisted of Truck 7, Engine 71, and Paramedic 56D. Engine 71 supplemented Truck 7 in completing the 360-degree assessment of the dwelling.	F.7.1 The IC must articulate the companies that form a RIC at an incident, including single resources like Paramedic 56D at this incident.	Operations Command	**1**	
F.8. Crews working on the first floor of the structure during the MAYDAY immediately attempted to rescue FF Flynn but determine that rescue should be made via the basement.	F.8.1 An additional Safety Officer should be assigned to RIC operations with responsibility of the safety of the RIC. The Safety Officer should monitor incident conditions and operational periods to assist with managing air supply. If necessary, the Safety Officer should request additional resources to ensure the RIC operation may continue with minimal interruption.	Operations Command	**1**	
F.9. The RIC members and members that assisted with the operation overcame all obstacles presented to them. Although FF Flynn did not survive, the actions and bravery of the crews allowed the safe recovery of him from the structure.	No recommendation			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
F.10. For large structures with multiple points of entry, a second RIC is needed to ensure quick response time to any potential MAYDAY emergency.	F.10.1 ICs should consider assigning additional RICs when multiple points of entry are used. The size of the structure should identify the need for additional RIC's and/or enlarging the RIC to ensure adequate personnel are assigned if an emergency occurs. F.10.2 HCDFRS must develop a General Order that Addresses tiered RIC structures based on the complexity of an incident (e.g., adding additional engine(s), special services, or a collapse team with a Level II RIC structure).	Operations Command	**1**	
Accountability				
G.1 Some of the responding units lacked Level I accountability established under HCDFRS General Order 300.02: Personnel Accountability because of inconsistent collection and organization of Personnel Accountability Tags.	G.1.1 Revise General Order 300.02 Personnel Accountability. Specifically, an accountability manager is critical to the safety of operating crews and there should be a standard process to quickly appoint one on all multi-unit responses. G.1.2 All members of HCDFRS should be provided accountability and crew integrity training so they understand the necessity for and	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	implementation of accountability relating to incident management, PARs, and MAYDAY situations. G.1.3 HCDFRS must revise the personnel accountability control boards to better meet the intent of NFPA 1561 4.5.2, particularly to identify units' geographical location and functional assignments. G.1.4 HCDFRS should provide initial and continuous training to responders on General Order 300.02: Personnel Accountability and, in particular, identify the need for use of remote accountability boards at incidents that involve large structures or large incident scenes. This should include training for initial responders serving as an accountability manager for an incident commander or division and group supervisors.			
G.2 The Incident Commander's understanding of crew location and deployment did not match the actual locations of the crew.	G.2.1 HCDFRS should initiate the use of common terminology when referencing occupancies in all communications, to maintain a shared mental model. In particular, all HCDFRS members should	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	reference occupancies based on NIMS Incident Command System. G.2.2 General Order 310.01 (41) should be revised to reflect this recommendation and crews should use "floor number ____" in all communications when referencing floors of a structure in conjunction with basement, attic and roof as specified in General Order 300.07: Incident Command System(Line 278). G.2.3 HCDFRS crews should state Location in addition to Conditions, Actions and Needs (LCAN) when an assignment is completed or when requested by the Incident Commander. This change should be reflected in the applicable General Orders. G.2.4 In revising General Orders, HCDFRS should consider emphasizing reporting a PAR at the end of an LCAN report.			
G.3 Although the Incident Commander had a general understanding of staffing levels from Engine 51, Engine 101, Tower 10 and later responding units—and the officers of those units clearly	G.3.1 HCDFRS should examine how volunteer member accountability is maintained and should determine a means of tracking volunteer member's staffing on units as it	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
know the number of firefighters, their names, and their crew numbers—there is no indication that the Incident Commander had foreknowledge of additional staffing provided by volunteer firefighters on Engine 51 or any other volunteer station.	changes throughout any particular shift. G.3.2 Use of new or existing technologies could assist in identifying staffing levels. HCDFRS should explore technologies and procedures available to address volunteer and career staffing assignments.			
G.4 In reviewing the policies and practices of Heavy Vehicle Operators (HVOs) there appears to be room for interpretation of whether HVO PATs remain with their assigned apparatus or are included in the collector ring with the crew.	G.4.1 HCDFRS should consider establishing a procedure to account for an HVO and the HVO's PAT when a HVO operates separate of a crew as represented on the crew's collector ring. G.4.2 Establishing a procedure for PATs and collector rings to account for a fire fighter who moves between crews at an incident will enhance accountability.	Operations Command	**1**	
G.5 It is unclear whether personnel who responded to the scene, but were not dispatched, followed the appropriate protocols for accountability.	G.5.1 HCDFRS should review associated General Orders and modify as needed to restrict an officer from self-dispatching units by phone or radio to an incident,	Operations Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	separate of the Incident Commander.			
G.6 While there are clear guidelines for the Communications Center responsibilities to support accountability efforts, the investigation revealed a conflict between the Communications Center's understanding and the General Orders.	G.6.1 The HCDFRS and Communications Center must agree upon how unit staffing information will be relayed from units and summarized to the incident commander on multi-unit responses. The result should be consistent written policies and training for both HCDFRS and Communications Center staff.	Howard County Police Department	**2**	
G.7 Communications Center discontinued the fifteen (15) minute notifications during the incident after the MAYDAY transmission.	G.7.1 HCDFS should establish a command channel on incidents as needed G.7.2 To align with NFPA Standard 1500.8.2.5.1, HCDFRS should adjust its interval notifications from fifteen (15) minutes to ten (10) minutes. G.7.3 The practice of time interval notifications from Communications Center to the Incident Commander is a critical task that should be continued. During a MAYDAY, the notifications should be restricted to a command channel. After the MAYDAY situation is resolved,	Howard County Police Department	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	interval notifications should resume on the operations channel.			
G.8 HCDFRS General Order 300.02 Personal Accountability does not reflect current fireground operations.	G.8.1 General Order 300.02 Personnel Accountability should be reviewed, updated and republished. G.8.2 All General Orders that reference or discuss Accountability procedures should be congruent to the revised General Order 300.02: Personnel Accountability.	Operations Command	**1**	
G.9 The current system for accountability using verbal PAR reports is time consuming and requires significant radio communications	G.9.1 HCDFRS should investigate an electronic or radio-based PAR system.	County Administration	**3**	
G.10 The Charlie Division supervisor was unclear as to which crews were assigned to his division during the Incident.	G.10.1 HCDFRS should consider division and group supervisors having an accountability manager to assist with accountability when the situational demands exceed the ability of a group or division supervisor to make decisions and maintain accountability of units and personnel.	Operations Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
G.11 Crews were provided specific assignments but did not consistently refer to themselves by their assignments.	G.11.1 HCDFRS should provide additional training on proper radio procedures pursuant to General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines and General Order 300.07: Incident Command System. Additionally, training should be provided on the use of the "communications order model" as specified in General Order 410.01: Communications, Section 9.3.	Operations Command & Operations Support Command	**1**	
Crew Integrity				
H.1. Paramedic 56's crew did not maintain crew integrity as the crew divided to accomplish both Initial Rapid Intervention Crew (IRIC) duties and water supply duties.	H.1.1. Fire Chief must ensure unit supervisors and crew members are trained on and implement best practices for maintaining crew integrity. This includes: ○ Verbalizing to all responders any deviations from a General order; ○ Pausing operations to restate crew tasks and objective and to regain crew integrity whenever a supervisor	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	observes crew members violating such integrity; and o Ensuring crew members inform their supervisors of their location and task or objective if they are given a conflicting order by a different supervisor.\Implement Crew Resource Management to make crew responsible for crew safety and situational awareness.			
H.2. The Rapid Intervention Crew demonstrated an extraordinary level of crew integrity on this incident given the fact that the Rapid Intervention Crew (RIC) comprised crews from Engine 71, Truck 7, and Paramedic 56D.	H.2.1 Personnel must train together on a regular basis to allow all crew members to identify the crew's strengths, weaknesses, and enhance team cohesiveness. Training priorities should include topics that are low-frequency, high-risk, such as RIC deployments. The goal being that crew integrity will be maintained as various types of operations are conducted.	Operations Command & Operations Support Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
H.3. Engine 111 also did not maintain crew integrity by separating crew.	See recommendation H.1.1			
H.4. Engine 51A could not account for crew members after the MAYDAY	See recommendation H.1.1			
H.5. Battalion Chief 1 and Command Aide maintained crew integrity, although the Command Aide completed duties outside of their normal tasks.	H.5.1 When the Command Aide assists crew members with tasks outside of their scope, the Command Aide must notify the Battalion Chief of the additional task.	Operations Command	**1**	
H.6. Other resources operating individually may pose a problem if they enter the IDLH without becoming part of a crew	H.6.1 Ensure that ICs require any individual entering the IDLH to become part of a minimum 2-person crew.	Operations Command	**1**	
Effective Response Force				
I.1 esponse assignment initially dispatched to manage this incident was consistent with HCDFRS policies in place at the time of the incident	I.1.1 HCDFRS must clearly define parameters of a Local Box Alarm versus a Full Box Alarm I.1.2 HCDFRS should codify expectations for units responding to Local Box Alarms, including a dedicated RIC company and an ability to establish a secondary water supply	Fire Chief	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	I.1.3 Local Box Alarm and Full Box Alarm assignments should be standardized throughout the Baltimore Metropolitan Region			
I.2 7005 Woodscape Drive was an 8,400 square foot residential structure, however initial response treated it similarly to a smaller single-family home rather than adapting staffing, strategy and tactics for the unique size and scale of the residence.	I.2.1 HCDFRS must train personnel to recognize how structure size, residential or commercial, affects visual cues such as smoke characteristics.	Support Services	**2**	
Health and Safety				
J.1 Not all personnel on the fireground had an up-to-date physical.	J.1.1 General Order 120.02 Volunteer Officer Requirements should be amended to require all volunteer fire fighters obtain a yearly NFPA 1582 physical, including certification of their ability to safely operate an SCBA. J.1.2 HCDFRS should fully enforce 29 CFR 1910.134, mandating that any and all members on the fireground	Fire Chief	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	must be properly fit tested and medically certified to use SCBA. J.1.3 HCDFRS should develop a records management system that accurately accounts for all operational department members and their medical certification status and annual fit testing.			
J.2 Several members on scene operated within an IDLH environment with SCBA without the appropriate fit testing or medical certification, which is non-compliant to 29 CFR 1910.134. All four (4) of the individuals who operated in the IDLH environment without these certifications were volunteer firefighters.	See Recommendations [J.1.1 & 1.2]	Support Services	**2**	
J.3 There was no formal rehabilitation process or area established for members on the fireground to recharge and be evaluated for continued fitness of duty.	J.3.1 Develop a rehabilitation general order consistent with the intent of NFPA 1584. J.3.2 Develop a mechanism to ensure that one of the volunteer operated canteen units is available to respond to an incident request in a timely and consistent matter.	Operations Command	**2**	
J.4 With the complexity of this incident and size of the structure, it was unreasonable to only have one safety	J.4.1 Expand the response plan for the Field Safety Officer to include responding on all local box alarms to	Fire Chief	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
officer on the fireground. Although there was not another safety officer on the fireground, a second safety officer could have been requested and filled by a Company Officer, Chief Officer, or mutual aid Officer.	provide on scene safety oversight. Having on scene safety oversight is critical on incidents where an IDLH or active hot zone may be present. J.4.2 Deploy a second full time field Safety Officer. J.4.3 Establish a department order outlining procedures for preserving and documenting evidence at the scene of an employee injury, accident, or near miss.			
J.5 The change to HCDFRS on-call matrix, which occurred sometime after 2013, merged the on-call Safety Officer and on-call Battalion Chief into a single position. During this incident, that individual became the Incident Commander (relieving the initial Incident Commander) making it impossible for him to fulfill the duties of Safety Officer.	J.5.1 Re-establish a dedicated, on-call Safety Officer. J.5.2 Deploy a second full time field Safety Officer.	Fire Chief	**2**	
J.6 The Communications Center did not transmit periodic single extended alert tones at fifteen (15) minute intervals, as required by General Order 300.02 Personnel Accountability.	J.6.1 Amend HCDFRS General Orders to be consistent with NFPA 1500 8.2.5.1 to provide for 10-minute status updates from the Communication Center to the Incident Commander and provide the Communications Center with the	Fire Chief & Howard County Police Department	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	associated training to implement the changed order.			
J.7 Although an IRIC and RIC were established, it did not comply with the General Orders governing those areas.	J.7.1 Amend HCDFRS orders (310.01 Single Family and Townhouse Structure Fire Operational Guidelines, 300.11 Rapid Intervention and IDLH Initial Entry Teams) to clearly define which response unit(s) shall be the IRIC and RIC units. J.7.2 Amend applicable orders and response pattern to provide for an additional dedicated RIC engine on all Local Box and greater assignments. J.7.3 Amend applicable General Orders to reflect that an IRIC and/or RIC shall be established at the point of entry into the IDLH environment prior to entry, unless a known life hazard exists. J.7.4 Amend General Order 410.01 Communications to require that prior to entry into an IDLH environment, the crew leader shall verbally report their entry location, intended actions upon entry, and staffing level to the Incident Commander. The Incident Commander should confirm and approve the actions prior to entry.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
J.8 HCDFRS does not fully fund or maintain a robust behavioral health program.	J.8.1 Develop and implement a structured behavioral health program.	County Administration & Fire Chief	**3**	
J.9 HCDFRS provides minimal wellness or fitness support falling short of recommendations by national consensus standards.	J.9.1 Implement a mandatory, non-punitive, confidential fitness assessment program. This can be done independent of the annual physical, or incorporated into the annual physical, and done by the contracted Occupational Health provider. J.9.2 Develop a health education component to department training. J.9.3 Re-establish a functional Occupational Safety and Health Committee that is funded, respected, and utilized by senior administration. J.9.4 Develop, by training and administrative support, a culture of safety that transcends the organization. The culture must be supported by Administration and include continuous training for Safety Officers. Staffing in BOSH needs to be increased to meet the growing demands of the new culture and expanding workforce.	Fire Chief & Member Services Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	J.9.5 Conduct annual fire station safety inspection program consistent with NFPA and MOSH standards.			
J.10 HCDFRS current efforts to inspect and maintain PPE are inadequate to ensure that PPE is fully safe and functional for personnel.	J.10.1 Develop a PPE inspection, cleaning, and training program that effectively cleans PPE after exposure to contaminates and documents PPE maintenance across the garment lifespan.	Operations Command & Support Services	**2**	
Treatment				
K.1 Several personnel reported difficulty in removing FF Flynn's turnout gear while continuing treatment and some turn out gear was transported with FF Flynn.	K.1.1 A standardized process for removal of turnout gear of a downed fire fighter in breathing apparatus, as well as a process to initiate and secure a chain of custody of the gear, must be developed. This process needs to be in the form of a policy with an associated department-wide training completed to ensure competency.	Support Services	**2**	
K.2 Although General Order 310.01 does not pre-assign EMS-1 a function unless they are the First Arriving Chief or Command Officer, EMS-1 followed best practices in preparing for any medical needs.	K.2.1 HCDFRS must revise General Order 310.01 and assign EMS-1 and/or EMS-2 functional duties for preparing EMS and rehabilitation early into an incident. K.2.2 Should EMS-1 be used as command staff, HCDFRS must alert	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	EMS-2 to fulfill the EMS supervisory functions. K.2.3 HCDFRS must have an on-call EMS officer.			
K.3 Although the Medical Duty Officer was able to complete the Quality Assurance review, there is not a process for any external review of an incident.	K.3.1 HCDFRS must develop a policy that allows for and has a predetermined flow path for external QA.	Fire Chief	**2**	
K.4 The transport of FF Flynn used the only dedicated EMS transport unit.	K.4.1 Add an additional transport unit per alarm to ensure quick and effective treatment of civilian and fire service personnel.	Operations Command	**1**	
Training				
L.1. Although all HCFRS personnel train on the Incident Command System (ICS) neither the current General Orders nor the current training program establish a clear philosophy of Incident Command for divisions, groups and unit operations.	L.1.1 HCDFRS policies and training for the ICS must emphasize a mission-oriented philosophy of command.	Fire Chief	**1**	
L.2. Current HCDFRS training rarely provides realistic, practical, hands-on scenarios for personnel to master fireground fundamentals. Particularly noteworthy in this incident was the inability for	L.2.1 HCDFRS training must be conducted in realistic practical environments that contain the elements of stress and friction. L.2.2 HCDFRS must develop a competency-based mentorship and	Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
fireground personnel to properly identify situational cues that there was an active basement fire. This aspect alone should have indicated that entry on the first floor was unsafe and caused personnel to alter their tactics for fire attack.	training program to address effective rapid decision making and situational awareness on the fireground. Said program should include evaluative mechanisms for measuring an officer's core skills of proficiency for their position.			
L.3. HCDFRS personnel are trained in MAYDAY and RIC protocols and best practices.	See Recommendations L.2.1 & 2.2	Support Services	**2**	
L.4. HCDFRS MAYDAY training does not incorporate error prevention or error trapping on the fireground.	L.4.1 HCDFRS must implement practical, realistic training on preventing and trapping errors on the fireground.	Support Services	**2**	
L.5. Although many HCDFRS members have been trained on the Blue Card communication method, which uses the communications order model, personnel on the fireground did not effectively implement the communications order model.	L.5.1 HCDFRS's needs define the terminology conventions for geographic locations used on the fire scene. Training needs to include the terminology as well as practicing the proper functions in the communications order model	Operations Command & Support Services	**1**	
L.6. HCDFRS has deployed equipment into the field without adequate training on the equipment (Thermal Imagine Cameras and	L.6.1 Before any future equipment field deployment, HCDFRS must facilitate hands-on, competency-based training in realistic scenarios for all personnel on the equipment.	Operations Command & Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
Motorola APX8000XE portable radios).	L.6.2 HCDFRS needs to develop a training program that incorporates NFPA 1408, Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers.			
L.7. After a review of the HCDFRS training General Orders the ISRB recognized a discrepancy between the minimum training requirements for Career HCDFRS and Corporate Volunteer officers.	L.7.1 All HCDFRS personnel, career and corporate volunteer, of the same rank should have the same minimum training to assure consistency and team cohesion.	Fire Chief	**1**	
Personal Protective Equipment				
M.1 FF Flynn's personal protective clothing had not received advanced inspection or cleaning within the twelve (12) months prior to the incident.	M.1.1 The Howard County Department of Fire and Rescue Services should consider incorporating guidance from Special Order 2004-42 into a newly issued General Order that aligns with NFPA 1851. This order should mandate yearly advanced inspection and cleaning of all personal protective equipment, regardless of soiled condition, to assure that this equipment is in safe and serviceable condition.	Fire Chief	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
M.2 Although FF Flynn's turnout coat had his name displayed on the rear tail, some personnel on the fireground did not have their names displayed on the rear of their coats.	M.2.1 General Order 530.02 should be revised to require all turnout coats to have the member's last name affixed to the rear tail of the coat. Should multiple members have the same last name, additional lettering would be used to further differentiate those individuals. M.2.2 Officers should assure all of their personnel have their name affixed to the rear tail of their turnout coats and request name panels for personnel, as necessary.	Support Command	**2**	
M.3 FF Flynn's personally owned helmet and firefighting boots were greater than ten (10) years from manufacture date.	See Recommendation M.1.1 M.3.1 General Order 530.02, Personal Protective Equipment, should be revised to align with NFPA Standard 1971. These revisions should include: o An explicit prohibition of any modifications to equipment that would compromise or	Support Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	void its NFPA 1971 certification. o Allowable length of service parameters for all personal protective clothing and equipment items.			
M.4 The examination of FF Flynn's protective hood revealed holes in the rear bib that matched the size and spacing of the snaps used to attach the coat liner to the outer shell of the turnout coat and collar.	See Recommendation M.3.1			
M.5 The independent examiner indicated that FF Flynn's turnout coat collar was not in a raised and secured position.	M.5.1 Instruction and training for personal protective equipment should focus on proper donning of the entire safety ensemble, including the importance of utilizing and securing all components for maximum safety and protection (i.e. collars up, snaps fastened, etc.). M.5.2 Personnel should ensure that all clothing is fully and properly donned	Operations Command & Support Services	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	during any structural firefighting event for their safety.			
M.6 It was noted that FF Flynn was wearing reissued personal protective equipment and not gear that had been manufactured to his specifications.	M.6.1 HCDFRS Quartermaster should continue their existing process of assuring gear is properly sized when re-issuing serviceable gear.	Support Services	**3**	
SCBA				
M.7 FF Flynn used an SCBA with the identifier (E101C) that did not correspond with his riding position and assignment (E101B).	M.7.1 Create or update a General Order to institutionalize cultural practice of associating SCBA with riding positions. M.7.2 Educate personnel on the important current practice of keeping SCBA in the riding position for which it is identified. Whenever an SCBA is removed from apparatus for maintenance, a spare SCBA is to be placed in the vacant position. M.7.3 Make available a spare SCBA with the same functional capabilities (i.e. thermal imaging camera) as the SCBA removed from service.	Operations Command & Support Services	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	M.7.4 Remind personnel to assure that their SCBA and portable radio identifiers match. (The only exception being when utilizing a spare SCBA due to SCBA being out for maintenance.).			
M.8 Although the Howard County Department of Fire and Rescue Services owns MSA A2 SCBA monitoring software, the software has not been adopted for use on the fireground.	M.8.1 Develop a plan for the use of MSA A2 SCBA monitoring software, to include identifying who is responsible for monitoring the software on an incident and begin utilizing this software on incidents.	Operations Command	**2**	
M.9 Some SCBA unit control modules do not have an accurate date and time saved.	M.9.1 Evaluate all department SCBA for low or dead internal clock batteries and replace affected power modules, utilizing warranty provisions whenever possible. M.9.2 Evaluate BA Shop staffing options to provide for more efficient and timelier SCBA maintenance.	Support Services	**2**	
Apparatus and Equipment				

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
N.1. The age of many HCDFRS apparatus exceeds the recommended lifespan from the Optimal Vehicle Replacement Cycle Analyses conducted by Mercury Associates Inc.	N.1.1 HCDFRS shall replace apparatus that exceeds the recommended lifespan from the Mercury Associates report.	County Administratio n	**3**	
N.2. Engine 51's 25-foot hydraulic extension hose couplings were corroded.	N.2.1 HCDFRS must revise its Vehicle Check Sheet to include the Hydraulic pump, hydraulic lines, and the 25-foot hydraulic line extensions to the Weekly Check Sheet, including lubrication and exercise of the couplings.	Support Services	**1**	
N.3. Engine 51's air conditioning compressor locked up on the fireground, threatening pump operations. Operations were only able to continue thanks to FDVFD's mechanic responding to the scene and temporarily fixing the mechanical issue.	N.3.1 A Ground Support representative and a mechanic from the County Maintenance Facility must be added to the on-call availability. N.3.2 All HCDFRS apparatus purchases should be designed in a fashion so that critical apparatus functions run independently from internal climate control.	County Administratio n & Fire Chief	**3**	
N.4. Engine 22 (Reserve Engine 178) experienced mechanical failure	N.4.1 All completed repairs and maintenance must be documented, with a copy of the documentation	Support Services &	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
during the incident, placing the unit out of service.	returned with the apparatus. Units must be placed out of service if there are persistent mechanical issues that may impact critical apparatus functions.	County Fleet Maintenance		
N.5. Engine 22 should have been placed out of service prior to the incident due to recurrent issues--regarding the coolant sensor, oil pressure and an oil leak—that met the NFPA 1911 standard for taking a unit out of service.	See Recommendations N.4.1 & 4.2			
N.6. The 75-foot, 1 ¾-inch hose from Engine 101's Clemens Pack failed during the incident. There is no record of the hose being inspected, as required by Special Order 2018.30, and no record of the damaged hose's disposal.	N.6.1 Each section of hose must be assigned an identification number in accordance with NFPA 1962 4.11.1.2 and logged into a database, so it can be easily tracked for hose testing and out of service documentation. A section of hose that is taken out of service should be followed up with a Help Desk submission and entered in to the database with its reason for being taking out of service.	Operations Command & Support Services	**2**	
N.7. Not all Howard County Fire Rescue-Vehicle Check Sheets were	N.7.1 Apparatus Daily and Weekly check off sheets must be custom to that piece of Apparatus.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
completed and/or recorded as required by General Order 510.03.	N.7.2 Each check off sheet must be filled out to include the date, unit number, and FAICS number. N.7.3 A designee assigned by the station Captain must maintain the apparatus check sheets, repair receipts and maintenance logs. N.7.4 HCDFRS should evaluate technology solutions to aid in maintenance, inspection, and inventory check sheets. Ideally, this electronic system will be compatible with smartphones and station computers.			
N.8. HCDFRS has adopted NFPA 1962 standards for nozzle testing, but not all tests from the standard are reflected in inspection checklists.	N.8.1 HCDFRS Nozzle and Appliance Inspection Checklist, found in Appendix B of Special Order 2018.30, should be amended to include service testing of Nozzles as recommended by NFPA 1962 5.3.	Operations Command	**2**	
N.9. HCDFRS has neither standardized thermal imaging devices deployed in the field, nor established training for thermal imaging devices.	N.9.1 Prior to placing thermal imagers in service, training shall be implemented. Including, but not limited to, operation, application, use, and limitations as stated in NFPA 1408. All training shall be documented and placed in the training log.	Support Services	**1**	