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| **Revision Date:** | 2015MAR | **State of Illinois Emergency Management Agency** | **Hazard ID:** | **FLOOD** |
| **Revised By:** |  |  | **Use By:** |  |

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| **SHORT-TERM RESPONSE OBJECTIVES** |  | **RESOURCE GUIDELINE FOR RESPONSE** | | |
| * Provide Flood Fighting Resources (Personnel, Equipment, Commodities) * Provide Force Security & Protection * Assure Responder Welfare * Provide For the Public’s Welfare   (Food & Water, Well-being checks, Aid)   * Establish Evacuation Systems * Establish Shelters * Support/Perform Evacuations * Provide Healthcare * Restore WWTF and Potable Water Supplies/Systems * Restore Power * Establish Temporary Transportation Routes * Restore Transportation Routes * Provide Specialized Resources   (SAR, C3, Lighting)   * Establish Fuel and Maintenance Schedules and Depots * Establish/Restore Communications * Evaluate/Implement Hazardous Materials Operations * Conduct Debris Removal * Implement Debris Management * Provide Animal Services/Care * Provide Public Information Messaging   **SECONDARY CONSIDERATIONS**   * Environmental impact * Long-term monitoring and clean-up * Loss of economy and infrastructure * Foodborne/waterborne illnesses * Medical capacity and capability * Monitoring, Sampling, and Mitigation * Personnel Protective Equipment * Psychological implications * Vendor and insurance fraud |  | **RESOURCE TYPE** | **QNTY** | **PURPOSE** |
| IDNR – Sworn L/E  IDNR – Water Specialist  IDNR – Aquatic/Wildlife - Biologist IDNR  IDNR – Laboratory Technicians (IIDNR)  IDNR – Heavy Equipment Operator  IDNR – Dam Engineer  IDNR – Engineers  IDNR – Engineering Technician  IDNR – Well Inspectors  IDNR – Mine Rescue Specialists  IDNR – Water Trailers  IDNR – Semi-Truck w/ Trailer  IDNR – Dump Truck  IDNR – Backhoe  IDNR – End Loader  IDNR – Bulldozer  IDNR – Excavator  IDNR – Grader  IDNR – Water Level Recorders  IDNR – Boats, Variable  IDOA – Laboratory  IDOT – End Loader  IDOT – Pumps  IDOT – Boat  IDOT – Message Board  IDOT – Arrow Board  IDOT – 3-Ton Truck  IDOT – Heavy Truck  IDOT – Light Truck  IDOT – HWY Labor (Personnel)  IDOT – Day Labor, General (Personnel)  IDOT – FW Raytheon KA 350  IDOT – FW Cessna 337  IDOT – H – Sikorsky S-76B  IDOT – H Bell BH206L3  ICC Regional Representative - UAC |  | L/E, Conservation, River Patrol  Situational Awareness, Disaster Intelligence  Conservation, Monitoring, Assessment  Monitoring, Assessment, Analysis  Dam/Levee Repair  Dam/Levee Repair  Dam/Levee Repair  Dam/Levee Repair  Monitoring, Assessment, Analysis  SAR, Mine Rescue  Potable Water  Hauling Heavy Equipment  Dam/Levee Repair, Hauling, Evacuation  Dam/Levee Repair  Dam/Levee Repair  Dam/Levee Repair  Dam/Levee Repair  Dam/Levee Repair  Monitoring, Assessment  River Patrol and Enforcement, SAR  Monitoring, Assessment, Analysis  Debris Removal, Sand, Hauling  Water Removal, CIKR Protection  SAR, CIKR Protection, Inspections  Public Information and Messaging  Public Information and Messaging  Hauling, Loading, Evacuation,  Hauling, Loading  Hauling, Loading, Transportation  Debris Removal, Flood Fighting, Res. Mgmt.  Debris Removal, Flood Fighting, Res. Mgmt.  Aerial Monitoring, VIP Transport  Aerial Monitoring, VIP Transport  Aerial Monitoring, VIP Transport  Aerial Monitoring, VIP Transport  Liaison w/ Private Sector – Transportation |

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| **SAFETY CONSIDERATIONS AND WARNINGS** |  | **PRE IDENTIFIED RESOURCE INVENTORY** | | |
| * **Staff will maintain a safe working environment throughout operations.** * **Due to the extended working period, staff will be cognizant of stress, fatigue, and the need for adequate rest periods.** * **Personnel on and or working near waterways, rivers, and/or levees/dams will wear assigned personal flotation devices (PFD) during operations.** * **All staff should be cognizant of potential lift, trip, fall, pinch, electrical, puncture, chemical and environmental hazards associated with operations.** * **All staff should be cognizant of potential waterborne, foodborne, and vector hazards associated with flooding and potential environmental conditions.** * **All staff should be cognizant of the potential for landslides, soil erosion, overtopping/breeching of levees and dams, and washouts caused from flood damage or inundation.** * **All staff should be cognizant of vehicle traffic and heavy equipment operations in their assigned area of operations (AO).** * **All staff should remain up-to-date and aware of any specified exclusion areas and/or evacuation areas and receive approval from CMD prior to entry or operations within these AOs.** * **Any and all situations warranting law enforcement intervention will be immediately directed to the appropriate authorities. At no time will staff intercede in law enforcement activities.** * **Injuries or medical concerns/conditions will be reported to the medical staff on-site immediately and/or 911 as appropriate.** |  | **RESOURCE TYPE** | **QNTY** | **PURPOSE** |
| IDPH – Environmental Health Personnel  IDPH – Water Sampling Personnel  IDPH – Food Inspectors  IDPH – State MCM Stockpile  CMS – Fuel/Maintenance Contracts  IEMA – CMD Vehicles  IEMA – Communications Vehicle  IEMA – Satellite Vehicle  IEMA – Regional Command Trailers  IEMA – Logistics Trailer  IEMA – Cars, Passenger  IEMA – Personnel – UAC – FWD AO  IEMA – Personnel - Recovery  IEMA – Regional Command Trailers  IEMA – Fuel Tanker  EMAT – IESMA  UCP - IESMA  ITEC Team and Trailer  Radios, Portable, STARCOM  Sandbags  ISP – Sworn L/E  ILEAS – Sworn L/E  Decontamination Vehicle – MABAS  Tent City – MABAS  Medical Response Team - IMERT  **DUAL STATUS – GUB. ACTIVATION**  ING – Personnel and Equipment  USACE (Federal) |  | Proximity, Specialized Skills  Monitoring, Assessment, Analysis  Proximity, Specialized Skills  MCM for Waterborne and P/H Requirements  Sustainment and Re-supply  UAC, RSOI, Logs Base (C3)  Interoperable Communications / C3  Interoperable Communications / C3  FWD Command, Communications, D/A  Resource Management / Logistics / FWD AO  Transport / Damage Assessment / Mobility  Liaison / Staffing UAC  Recovery Specialists / DA  FWD Command, Communications, D/A  Sustainment  Emergency Management  Emergency Management/C3  Communications Restoration, Interoperability  Communications  Flood Fighting, General  Force Security and Protection  MOU - Force Security and Protection  Decontamination, Personal Hygiene  Temporary Housing – Response Personnel  Medical and Healthcare - Responders  **Defined by MRP Specifications (Mission)**  Sandbagging, Levee Protection , Force Security and Protection, Evacuation, Communications, Logistics, Power Restoration, HAZMAT  Federal request for assistance: Sandbags, Pumps, Transport, Subject Matter Expertise |

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| **SANDBAGGING OPERATIONS** |  | **SANDBAGGING (RINGING) BOILS** | | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Linear Feet** | NUMBER OF SANDBAGS REQUIRED | | | | | | **Height of Wall *(in feet)*** | | | | | | **1’** | **2’** | **3’** | | **4’** | | 100’  Single Layer | 600 |  |  | |  | | **PYRAMID SANDBAG LEVEE** | | | | | | | 50’ | 250 | 850 | | 1,800 | 3,100 | | 100’ | 500 | 1,700 | | 3,600 | 6,200 | | 200’ | 1,000 | 3,400 | | 7,200 | 12,400 | | 300’ | 1,500 | 5,100 | | 10,800 | 18,600 |   **Pyramid Sandbag Formula**  N = 3H X 9H2  X Length in feet  2  N = Total number of sandbags needed  3H = Height of sandbag wall  9H2  = Width of sandbag wall   * 1 bag length equals about 1 foot * 3 bag widths equals about 2-1/2 feet * 3 bags high equals about 1 foot * *Single width course requires 300 bags per 100 linear feet, one foot high*   **SAND ESTIMATES**   * One Tandem Truck of Sand = approximately 10 Tons * 10 Tons of sand fills approximately 1,200 30# bags |  | **Do not attempt to place sandbags over the boil.**   * Maintain a minimum 2 – 3 feet radius from the center of the boil to the edge of the sandbag dike. * Tie the sandbag dike into the levee if the boil is near the toe of the levee * Build a half-moon shaped ring dike if the boil is on the levee slope. * Ensure the entire area of the boil is ringed within the dike. * The height of a ring dike should be only sufficient enough to create enough head to reduce flow through the boil so that no more material is displaced and the boil runs clear. * Build a spillway (runoff) to control/remove runoff away from the ring dike and prevent erosion. * Cover spillway and runoff slope with visquine or other material to prevent erosion. * Once spillway water is running clear and free of sand, dirt, gravel and/or debris the ring dike is complete. | |  | |
| **ALTERNATIVES - DIVERSION/DIKING/BARRIERS** | | | **FLASH BOARD/BOX LEVEE** |
| **STRAW BALES**   * Secure straw bales to the levee top by driving 4-10 feet stakes or rebar through each bale into the levee. Weight straw bales down with filled sand bags. * Straw bales come in a variety of sizes to include 18” wide X 30” long and 4’H X 4’W X 8’L   **JERSEY BARRIERS**   * Install concrete Jersey Barriers as flow diversion channels.   **PLASTIC SHEETING**   * Install plastic sheeting or visquine and load with sand to form a diversion barrier or dike by folding plastic back against sand piles.   **FLASH BOARD**   * Install flash boards (2’H X’ 8”W X L) facing river/flood side of levee. Secure in place with 2 X 4 stakes approximately 5’ in length. Stakes must be set a minimum of 2” into the levee top. Back fill the flash board dike with earth or sandbags to prevent movement and flexing. Back fill should be graded at 2’ to 1’ length/ grade. | | | **FLASH BOARD LEVEE**    **BOX LEVEE** |
| **DEBRIS ESTIMATION – Mixed & Vegetative Only** |  | **DEBRIS ESTIMATION - Homes** | **DEBRIS - RULES OF THUMB** | | |
| ***Ground Measurements***  One acre of debris 10 feet high converts to 16,133 CY  43,560 SF x 10 FT = 16,133 CY  27  ***Conversion Factors for tons and cubic yards of debris***  Construction and demolition debris: 1 ton = 2 CY  Mixed debris: 1 ton = 4 CY  Vegetative debris:  Hardwoods: 1 ton = 4 CY  Softwoods: 1 ton = 6 CY   * 15 trees 8 inches in diameter = 40 cy (average) * Root system (8’-10’ diameter) = one flatbed trailer   ***VCM for Single Family Homes***   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Typical House (Square Feet)** | **Vegetative Cover Multiplier** | | | | | **None** | **Light (1.1)** | **Medium (1.3)** | **Heavy (1.5)** | | 1000 SF | 200 CY | 220 CY | 260 CY | 300 CY | | 1200 SF | 240 CY | 264 CY | 312 CY | 360 CY | | 1400 SF | 280 CY | 308 CY | 364 CY | 420 CY | | 1600 SF | 320 CY | 352 CY | 416 CY | 480 CY | | 1800 SF | 360 CY | 396 CY | 468 CY | 540 CY | | 2000 SF | 400 CY | 440 CY | 520 CY | 600 CY | | 2200 SF | 440 CY | 484 CY | 572 CY | 660 CY | | 2400 SF | 480 CY | 528 CY | 624 CY | 720 CY | | 2600 SF | 520 CY | 572 CY | 676 CY | 780 CY |  * ***For multiple-story residences, the debris generated by the demolished residence should be calculated using the total number of stories.*** |  | ***Mobile Home Formulas***  Typical single-wide mobile home: 290 CY  Typical double-wide mobile home: 415 CY  ***Personal Property on Public Rights-of-Way***  Slab on grade home: 25–30 CY  Home with a basement: 45–50 CY  ***General Building Formula***  Length x Width x Height x 0.33 = CY  27  ***Single Family Residence Formula***  Length x Width x S x 0.20 x VCM = CY   * *Length and Width must be in feet* * *S = number of stories in the building* * *0.20 = a constant based on the study data* * *VCM = a vegetative cover multiplier* | * To convert cubic yards of Construction & Demolition (C&D) debris to tons, divide by 2.   Cubic Yards = ­­\_\_\_\_\_\_\_\_T  2   * *To convert tons of C&D debris to cubic yards, multiply by 2.* * To convert cubic yards of woody debris to tons, divide by 4.   Cubic Yards = ­­\_\_\_\_\_\_\_\_T  4   * *To convert tons of woody debris to cubic yards, multiply by 4.* | | |
| **FLOOD DEBRIS** | | | **LINKS** |
| * Amount of personal property (as debris) from average one-story flooded residence without a basement: 25-30 cy * Amount of personal property (as debris) from average flooded residence with a basement: 45-50 cy * 27 cubic feet = 1 cubic yard | | | **NWS – NOAA**  **National Weather**  [**http://www.weather.gov/**](http://www.weather.gov/)  **River forecasts**  [**http://water.weather.gov/ahps/**](http://water.weather.gov/ahps/)  **Storm Prediction Center**  [**http://www.spc.noaa.gov/**](http://www.spc.noaa.gov/)  **USACE**  [**http://www.usace.army.mil/Library/MapsandCharts.aspx**](http://www.usace.army.mil/Library/MapsandCharts.aspx)  [**http://www.lrp.usace.army.mil/documents/Corps\_Flood-Fight\_Handbook\_2009.pdf**](http://www.lrp.usace.army.mil/documents/Corps_Flood-Fight_Handbook_2009.pdf) |
| **GLOSSARY OF TERMS** | | |
| **OVERTOPPING –** When the water level exceeds the crest elevation level of a levee and flows into protected areas.  **SEEPAGE –** Percolation of water through or under a levee and generally appearing at the landside toe.  **BREACH –** Ruptures, breaks, or gaps in a levee system whose cause has not been determined.  **FAILURE BREACH –** A breach in a levee system where the failure cause is known and occurred without overtopping.  **OVERTOPPING BREACH –** A breach whose cause is known to be overtopping. | | |