## Natural Flood Management Opportunity Mapping Context

The EA Funded NFM Opportunity Mapping project, was undertaken by MFFP, to determine the most beneficial catchments to undertake peatland restoration interventions that hold/slow water in the upper catchments and generate flood risk benefits for C@R.

The project used the 'Communities at Risk (2020)' data set for the East Midlands, Greater Manchester and Yorkshires regions within the core MFFP working area, provided by the Environment Agency, to prioritise where flooding is concentrated in catchments of interest and link degraded peatlands to communities at very significant and significant flood risk that could benefit from upstream peatland restoration interventions.

The project undertook the opportunity mapping exercise using the previous approaches undertaken by MFFP developed through our work at Stalybridge and Redvales and Radcliffe, and subsequent learnings, to identify relevant catchments /sub-catchments to be proposed for peatland restoration interventions based on anticipated flood risk outcomes.

### Origins and accuracy considerations of the NFM Opportunity Mapping methodology

For the opportunity mapping at Stalybridge, a Digital Terrain Model was generated from LiDAR and used to plot water flow routes and identify potential gully block locations over the headwater catchments of C@R in Greater Manchester. Guide water storage estimates volume were provided using a calculator based conceptually on the cross sectional volume of a half-cone. The DTM-based opportunity mapping overestimated the number of potential for gully blocking locations at the site, i.e. the number of feasible gully block locations following ground surveys and stakeholder consultation was lower (by approximately 50% overall) than that estimated by the opportunity mapping. However, the storage volume estimated for the confirmed dam locations prior to installation were 10% below the storage volumes calculated from initial measurements of the installed dams, meaning the 'half-cone' method for calculating storage volume is conservative but relatively accurate.

In response to these two observations from Stalybridge, MFFP now take an additional step between the GIS output and subsequent estimates of storage capacity, cost, etc. that takes feasibility of delivery into account, both in terms of the number of locations where gully blocks can be installed and unforeseen logistical or stakeholder issues. In doing so, calculations of deliverable outputs and outcomes will be based on a more conservative estimate of the number of gully block locations. Consequently, there can be more confidence that the outputs and outcomes for a given set of opportunities can be achieved, or over-delivered upon.

The installed gully blocks on Stalybridge continue to be monitored as part of the ProtectNFM project. The most recent publication[1] from the ProtectNFM project confirms that peatland restoration for multiple benefits can reduce flood risk, whether NFM was the focus of the restoration or not. It suggests that the effectiveness of peatland interventions can be improved by increasing a catchment's total "surface" storage, either through a trade-off of static storage capacity for more kinematic

[1] Goudarzi, S., Milledge, D.G., Holden, J., Evans, M.G., Allott, T.E., Shuttleworth, E.L., Pilkington, M. and Walker, J., 2021. Blanket Peat Restoration: Numerical Study of the Underlying Processes Delivering Natural Flood Management Benefits. Water Resources Research, 57(4), p.e2020WR029209.

storage (i.e. more permeable dams), or to increase total static storage capacity by "creating more shallow open water pools in other parts of the catchment as well as in channels and gullies, such that its volume is comparable to the large water volumes associated with flood relevant storms."