WHAT IS CLAIMED IS:

1. A method of video coding by a video decoder, comprising:

receiving a picture level syntax element indicating whether a prediction refinement with optical flow (PROF) for affine prediction is disabled for a current picture;

determining whether to apply the PROF to an affine coded block in the current picture based on the picture level syntax element indicating whether the PROF for affine prediction is disabled for the current picture; and

wherein responsive to the picture level syntax element indicating the PROF for affine prediction is disabled for the current picture, the PROF for affine prediction is not applied to the affine coded block in the current picture, and

wherein responsive to the PROF for affine prediction being determined as applied to the affine coded block,

generating spatial gradients $g_x(i,j)$ and $g_y(i,j)$ at a sample location (i,j) in the affine coded block for a prediction sample $I(i,j)$,

generating a prediction refinement $\Delta I(i,j)$ based on the spatial gradients $g_x(i,j)$ and $g_y(i,j)$, and

adding the prediction refinement $\Delta I(i,j)$ to the prediction sample $I(i,j)$ to generate a refined prediction sample.

2. The method of claim 1, wherein:

responsive to the picture level syntax element indicating the PROF for affine prediction is not disabled for the current picture, the PROF for affine prediction is applied to the affine coded block.

3. The method of claim 1, wherein the PROF is enabled for affine prediction by default.

4. The method of claim 1, wherein the determining whether to apply the PROF for affine prediction to the affine coded block includes:

determining whether to apply the PROF for affine prediction to the affine coded block based on values of affine parameters of an affine model of the affine coded block.

5. The method of claim 1, wherein the generating the spatial gradients $g_x(i,j)$ and $g_y(i,j)$ at the sample location (i,j) includes:

generating the spatial gradients $g_x(i,j)$ and $g_y(i,j)$ at the sample location (i,j) based on a first prediction sample(s) of a first sub-block including the prediction sample $I(i,j)$ and a second prediction sample(s) of a second sub-block neighboring the first sub-block, the first sub-block and the second sub-block being partitioned from the affine coded block.

6. The method of claim 1, wherein the generating the spatial gradients $g_x(i,j)$ and $g_y(i,j)$ at the sample location (i,j) includes:

performing inter prediction for sub-blocks of the affine coded block; and

generating spatial gradients at sample locations on a basis of prediction samples of the entire affine coded block.

7. The method of claim 1, wherein the generating the spatial gradients $g_x(i,j)$ and $g_y(i,j)$ at the sample location (i,j) includes:

generating the spatial gradients $g_x(i,j)$ and $g_y(i,j)$ at the sample location (i,j) using a generated gradient filter on reference samples in a reference picture of the affine coded block.

8. The method of claim 7, wherein the generated gradient filter is generated by a convolution of a first gradient filter and an interpolation filter,

wherein application of the interpolation filter on the reference samples in the reference picture of the affine coded block generates prediction samples of the affine coded block, and subsequent application of the first gradient filter on the generated prediction samples of the affine coded block generates the spatial gradients $g_x(i,j)$ and $g_y(i,j)$.

9. The method of claim 1, wherein the determining whether to apply the PROF for affine prediction to the affine coded block includes:

determining whether to apply the PROF for affine prediction to the affine coded block based on the received picture level syntax element indicating whether the PROF for affine prediction is disabled, and a signaling indicating whether a local illumination compensation (LIC) is enabled.

10. The method of claim 1, wherein the affine coded block is coded in an affine merge mode, and an LIC flag value of the affine coded block is inherited from a neighboring block of the affine coded block that is used as a source for affine model inheritance or affine model construction of the affine coded block.

11. An apparatus, comprising circuitry configured to perform the method according to any one of claims 1 to 10.